

Heat networks market study

Final report

23 July 2018

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1. Summary

- 1.1 This is the final report of our market study into heat networks supplying domestic customers. We launched the market study on 7 December 2017. On 10 May 2018 we published an update paper setting out progress in our market study and inviting views on our findings and possible recommendations.
- 1.2 We received over 20 responses from a wide range of stakeholders including consumer groups, trade bodies, heat network operators and housing associations. In this final report, we set out our findings and recommendations.
- 1.3 Heat networks provide heat and hot water to homes but, unlike other comparable services such as gas and electricity networks, heat networks are not regulated. Our study encompasses both communal heating systems supplying multiple customers in one building and district heating supplying multiple customers in multiple buildings. There are at least 14,000 heat networks in the UK (of which around 2,000 are district heating and the rest communal), together providing around 2% of UK buildings heat demand.
- 1.4 Heat networks form an important part of the UK's plan to reduce carbon emissions and cut heating bills for customers. An increased use of heat networks would be consistent with the government's stated strategy for clean growth. They can be a cost-effective way of reducing carbon emissions from heating and present an opportunity to exploit larger scale renewable and recovered heat sources. The Committee on Climate Change estimates that around 18% of UK heat will need to come from heat networks by 2050 if the UK is to meet its carbon targets cost effectively and the sector is forecast to grow significantly over this period.

Findings

- 1.5 We assessed the price and service quality offered by heat networks. For many customers, heat networks appear to offer an efficient supply of heat and hot water at prices which are the same or lower than other potential sources of supply (such as gas or electricity) and with comparable service standards.
- 1.6 However, for some customers – particularly those on certain privately-operated schemes – we have identified poorer outcomes in terms of price and service. We have examined three drivers of these concerns – property developers, heat network operators and customers having different interests; monopoly supply and delivery models; and low transparency.

- 1.7 Responses to the update paper agreed with our findings on the price and quality of heat networks and our identification of the drivers of poor outcomes for some customers.

Outcomes for heat network customers

- 1.8 Our statement of scope suggested that monopoly supply and supply chain incentives may mean that heat network providers face little competitive pressure to offer reasonable prices, reliable supply and high quality of service.

Prices

- 1.9 The research we have conducted indicates that unit prices and average bills vary significantly between networks. This is consistent with other external research. Overall, we found that average prices on the large majority of heat networks within our sample are close to or lower than the price of a gas heating-based comparator.
- 1.10 We observed some differentials in price distributions between different types of network in our sample. In particular, higher unit prices and total charges were associated with private networks and metered networks.
- 1.11 We found that there are a number of existing constraints on heat network prices:
- (a) Heat network operators and customers having the same interests – where the network is owned by the residents or a not-for-profit organisation, the operator and customer have the same interests and this places limits on prices and constrains the network operator.
 - (b) The method for setting prices – large heat network concessions all currently appear to agree a contract with a price related to cost incurred or to ‘avoided cost’ for customers (meaning a benchmark price based on having an individual gas boiler connected to the gas network) at the outset of a scheme.
 - (c) Reputational risk – some developers ensure that prices are kept low to avoid detriment to their reputation which could affect the sales of future developments or future releases of property within existing developments.
 - (d) Regulation – heat network schemes approved by the Greater London Authority or funded by the Department for Business, Energy & Industrial Strategy (BEIS) have to meet certain requirements including quality and pricing which is competitive relative to alternative fuels.

- 1.12 Although for many customers heat networks are currently no more expensive than other forms of heat, certain customers appear to be paying considerably more and there is a risk that factors driving high prices could become embedded as the sector grows.
- 1.13 We are particularly conscious of the potential impact on consumers of high prices and/or poor quality for essential services such as heat – which is further compounded in this sector by the fact that most heat network customers have no alternative source of heat and would not be covered by the proposed price caps in the gas and electricity sectors. We therefore focused on understanding the drivers of these poor outcomes for customers in our analysis and in considering remedial action.

Quality

- 1.14 In a survey for BEIS, heat network customers reported overall satisfaction (and dissatisfaction) in line with the wider population of consumers not on heat networks. However, customers reported higher incidence of interruptions than non-network heating, and less control over heating. Taking the BEIS and CMA findings together, customers of private and local authority operated schemes appear most likely to experience a loss of heating. Some concerns have been identified relating to customer access to information about their heating, frequency and content of bills.
- 1.15 Where problems arise with specific schemes, there is limited consumer protection and redress, and there may be issues with accountability. There is no sector regulator with responsibility for heat and, accordingly, customers do not automatically benefit from the rights and protections afforded to gas and electricity customers (such as protections for vulnerable consumers and access to an ombudsman).

The drivers of poor outcomes for customers

- 1.16 We explored three broad themes which appear to be driving poor outcomes for certain customers:
- (a) Property developers and heat network operators may not take the interests of end customers into account when taking decisions on the design and build of networks.
 - (b) The monopoly supply of heat networks and the delivery models used.
 - (c) Key information for customers is not transparent either before moving into a property or during residency.

Property developers, heat network operators and customers have different interests

- 1.17 There are two circumstances in which the different interests of property developers, heat network operators and customers can lead to inappropriate choice and design of heat networks:
- (a) Where the heat network does not provide heating and hot water solutions at the lowest cost to customers, but is the most cost-effective way for the developer to meet planning requirements.
 - (b) Where property developers fail to consider the whole life costs and try to minimise the upfront costs of designing and installing a heat network, and this results in higher ongoing costs for the operation and maintenance of the network, which fall on customers.

The monopoly supply of heat networks

- 1.18 We consider heat networks to be natural monopolies. Customers typically have no alternative sources of heat and may be locked into long-term contracts.
- 1.19 The extent to which this monopoly supply leads to consumer detriment may largely depend on the choice of delivery model and the rights and protections afforded to customers. In many cases, the risk of detriment is substantially reduced because the networks are operated by local authorities and housing associations which do not have the same profit motive and incentives as private operators.
- 1.20 For most communal heating schemes, once the network is built, the 'right to use' the network is passed from the freeholder to the leaseholder and the responsibility for managing the heat networks falls on landlords or a property management company.
- 1.21 An alternative delivery model, which is commonly adopted for privately-operated district and large communal heat networks, involves long-term arrangements being established with an energy service company (ESCO). Under this model, the 'right to use' the network will be leased out by the freeholder to the ESCO. The ESCO enters into a long-term agreement under which it has the right to access and operate the network and to charge customers for heat, normally under specified terms and conditions, such as by reference to a gas benchmark price. These agreements can vary in duration, but will tend to last a minimum of 20 years, and pass responsibility for the replacement of assets to the ESCO, which bills customers and collects revenues directly from them.

- 1.22 We found that where the 'right to use' the network is transferred to customers as part of their leaseholder or tenancy agreements, customer interests may be protected in the same way their interests are protected with respect to all communal assets in multi-tenanted residencies. In effect, the network is being operated on a not-for-profit model, preventing freeholders or property management companies from charging a profit margin in exchange for operating the network.
- 1.23 However, where the 'right to use' the network has effectively been transferred to an ESCO, end customers' interests (including tariffs and quality of service) are protected only to the extent that they were considered by the freeholder as part of the negotiation or tendering process.
- 1.24 We have found that the contracts between freeholders and ESCOs typically restrict the tariffs that ESCOs can charge to end customers and may also specify certain quality metrics. However, freeholders need not select an ESCO on these criteria alone. In particular, ESCOs may make a payment (commonly known as a 'capital contribution') to the property developer in return for the access rights. In these circumstances, it is likely that charges to end customers will reflect that payment, and hence be higher than where charges reflect only ongoing costs and where the developer must attempt to recover its full capital expenditure through the price of the property.

Transparency

- 1.25 Our findings indicate that consumer engagement and awareness of the type of heating in a property are low prior to property transactions. Even where potential customers are aware that heating is provided through a heat network, it tends to be of little significance in decision making due to the higher importance of other factors in the property search.
- 1.26 Customers generally develop an understanding of heat networks and how they are different to other forms of heating during or after moving into a property. This means that matters such as contract duration, exclusivity and relative pricing of heat networks compared to other energy options are often not considered until after customers have decided to move into a property.
- 1.27 During residency, we have found that there may be a lack of transparency for customers regarding heat bills, including the calculation of bills. This may make it more difficult for customers to control costs and plan outgoings. It may also lead to a reluctance to use heat. Where bills and charges are not transparent, customers may be less able to challenge suppliers about costs, prices and services – potentially reducing the pressure on suppliers to provide reliable, value-for-money heat.

- 1.28 Many customers do not have separate heat supply contracts. Instead, the supply of heat is governed by a leasehold or tenancy agreement meaning key information, contractual rights and obligations are less specific than in a dedicated heat supply contract.

Options for remedial action

- 1.29 We have considered options for remedial action to address the drivers of poor outcomes for heat network customers. Our objective is to ensure that further growth in the use of heat networks can be delivered in a way that maximises benefits for the users of the networks alongside the wider economic and environmental benefits.
- 1.30 We have identified a package of measures, which we consider are both practicable and able to be implemented quickly subject, where necessary, to enabling legislation. We expect that BEIS and the Scottish Government will be able to work with heat network industry stakeholders to undertake the detailed design phase of our proposed recommendations and consult industry stakeholders prior to implementation.
- 1.31 We consider that Ofgem would be well placed to take the role of sector regulator. It would also be in the position to participate in the process of regulatory design, to ensure that it is able to implement new regulations in line with our recommendations as quickly as possible.
- 1.32 We expect that these measures would work together, along with existing regulation, to ensure good outcomes for heat network customers without having an adverse effect on investment.
- 1.33 The scope of our recommendations is intended to protect domestic customers of all heat networks. However, given the anticipated growth of the sector and the issues we have identified in relation to the design and build of heat networks, some of our recommendations are targeted at the construction of new heat networks.

A statutory regime governing the regulation of heat networks is required

- 1.34 Our analysis does not show a systematic gap between heat prices and quality relative to benchmarks based on other sectors. However, we have identified material risks to certain heat network customers.
- 1.35 Many of the issues that we have identified, including the need to require compliance with technical standards, the need to define and monitor against standards of service and the implementation of consumer protection and redress mechanisms, would require ongoing intervention by a sector-specific

regulatory body. Responses to our update paper supported the need for a sector regulator, with a number stating that Ofgem would be well placed to take on this role.

- 1.36 An effective regulatory regime would require design of suitable duties for the regulator in relation to prices, quality of service, transparency of information and minimum technical standards. It would also require a mechanism to identify, monitor and enforce the regulation. This could be through a licensing regime, as is currently under consideration in Scotland, although other approaches would be feasible. For example, in communications, Ofcom regulates communications providers under an authorisation regime.
- 1.37 We are also making recommendations on other aspects of regulation that the sector regulator would need to implement in partnership with other public sector bodies. We consider that explicit recognition of heat networks should be developed in relation to:
- (a) Planning and Building Regulations, where we have identified that rules regarding heat networks are not clear enough.
 - (b) Leaseholder arrangements and tenancy agreements, where it should be clearer how heat networks are treated in terms of ownership and responsibility for operation and maintenance.
 - (c) Property sales disclosure rules including Energy Performance Certificates, which are not currently designed to reflect the performance of heat networks.

Addressing the drivers of poor outcomes for heat network customers

- 1.38 We consider that outcomes for heat network customers would be improved most effectively by addressing the drivers of these outcomes, rather than through direct intervention to control outcomes, such as prices and quality of service targets.

Introducing consumer protection for all heat network customers

- 1.39 We are conscious that issues relating to quality – particularly reliability – have the potential to cause serious harm to consumers. We therefore recommend that heat network customers are afforded the same degree of protections as customers in the gas and electricity sectors, both of which are licensed by Ofgem in Great Britain and the Northern Ireland Authority for Utility Regulation in Northern Ireland.

Improving network design and build

- 1.40 Network design and build should be improved to better align the interests of property developers, heat network operators and customers. Where heat networks are to supply new properties, we recommend that the developer's comparison of heat supply options (ie individual boilers, communal heating or district heating) should be based on a whole life costing approach. This should compare the end user heat price and quality with the comparable prices and quality of service customers would experience if they were supplied by alternative options in the regulated energy sector (such as individual gas or electric boilers).
- 1.41 We also consider that the implementation of minimum technical standards is a necessary step to protect customers from poorly designed, built and operated heat networks.
- 1.42 The industry is already working towards a voluntary quality assurance scheme to ensure that heat networks are built to a sufficiently high standard and to improve the quality of service received by customers. The Scottish Government is also working on proposals in relation to technical standards, which could become a requirement through a future licensing regime in Scotland.
- 1.43 In order to be effective, we have found that these technical standards would need to be codified clearly and made mandatory for the construction and operation of all new heat networks. We expect this may include an accreditation regime for compliance with these standards.
- 1.44 An accreditation regime would make it easier to develop the skills needed to build and operate new heat networks. In turn, this should allow new networks to deliver both the intended environmental benefits and an efficient and good value service for customers. Over time, existing networks should also be required to move towards compliance with these standards.

Addressing issues relating to monopoly supply, delivery models and pricing

- 1.45 During our study we considered a number of options that the sector regulator could adopt to constrain heat network operators from increasing prices or reducing service quality, where customers have no options to switch supplier. We were particularly concerned about privately-owned networks, where the financial interests of customers are not aligned with the network owner.
- 1.46 Following analysis and stakeholder engagement, we have concluded that the most effective approach to address the concerns relating to monopoly supply would be as follows:

- (a) For the sector regulator to develop rules and guidance around fair and reasonable approaches to pricing by heat network operators.
 - (b) There would be self-reporting by operators, but the regulator would have the ability to monitor prices charged to customers against the rules on pricing and be able to investigate customer complaints (ie 'principles-based' regulation rather than rather than a cap on prices).
 - (c) The rules and guidance should extend to the target quality of service offered by heat network operators.
 - (d) The rules should be directed at all heat network operators.
- 1.47 We considered more intrusive options to address the risks to customers from monopoly supply, such as banning capital contributions from ESCOs to property developers, mandatory re-tendering of heat network operating and billing contracts and requiring the 'right to use' to be retained by heat network customers. However, we found that these options would not be proportionate to address the risks that we identified and would restrict the business models available for heat network operators. In turn this could adversely affect incentives to invest in some heat network schemes which may be efficient and relatively low cost for consumers over their operating life.
- 1.48 We are not proposing direct intervention such as sector-wide price caps, which we expect would be unsuitable in what is a very diverse sector. However, the regulator would have enforcement powers where heat network operators do not comply with pricing rules and it is feasible that the regulator might need to intervene to reduce prices in limited cases where networks are pricing too high. The use of a 'principles-based' approach rather than direct intervention to set prices was supported by the majority of stakeholders.
- 1.49 We expect that pricing rules could be either based on pricing by reference to cost (including a reasonable margin) or by reference to a benchmark. The appropriate mechanism would depend on the nature of the network and the broader contractual arrangements, including whether there is an ESCO in place.

Addressing low transparency

- 1.50 Stakeholders emphasised the need for greater transparency of information. We assessed what information may be necessary to help consumers make appropriate decisions when considering whether to live in a property with a heat network and to help consumers understand and act upon their bills.

- 1.51 We make a number of recommendations to improve outcomes at the pre-transaction stage, including:
- (a) Prospective buyers and tenants should have access to better information on heat networks in a property before they sign a contract, including age, ownership, the identity of the operator, the duration of contracts and historic customer outcomes (such as tariffs and terms of service).
 - (b) Customers should have heat supply agreements or contracts with heat networks operators which set out the level of network performance and the obligations of the operator, including guaranteed terms of service.
 - (c) Clear reference to the treatment of the heat network assets in leasehold agreements, ie who owns the 'right to use' the network, and what the implications are for the basis on which customers will be charged for its hot water and heating services.
 - (d) Improving the provision and content of Energy Performance Certificates.
- 1.52 We also recommend that a number of information remedies are introduced to improve transparency of information during residency, including:
- (a) Providing more detail in heat supply bills (such as the period of the bill, unit cost and consumption) to enable customers to understand their bills and manage their usage.
 - (b) Introducing specific requirements to ensure that bills are sufficiently frequent.
 - (c) Introducing standard performance metrics – for example, in relation to planned and unplanned outages and heat temperatures.

Next steps

- 1.53 The publication of our recommendations does not mark the end of the CMA's involvement in the sector. We will continue to work with the UK Government, Scottish Government, Ofgem and public and private sector stakeholders on the implementation of our recommendations.
- 1.54 We have published an open letter to the sector alongside this report. In addition to reminding the industry of its obligations under competition and consumer law, we highlight the need for the industry to work to consistently deliver the best outcomes for consumers as the government examines our recommendation that the sector be formally regulated.

2. Introduction

Overview of the sector

- 2.1 Heat networks distribute thermal energy in the form of steam, hot water or chilled liquids from a central source of production through a network of pipes to multiple properties for the use of heating, cooling or hot water.¹
- 2.2 Heat networks comprise both *district heating*, where heat is distributed from a central source through a network to multiple buildings, and *communal heating* where heat is supplied within a single building to multiple occupants.
- 2.3 There are at least 14,000 heat networks in the UK (of which around 2,000 are district heating and the rest communal), together providing 12.8TWh per year (around 2% of UK buildings heat demand).² Around 91% of heat networks are located in England and 6% in Scotland. There are nearly 492,000 connections in total including 446,517 domestic customers.³ We estimate that the turnover of the heat network sector in the UK is currently around £300 million per annum.
- 2.4 A large proportion of networks (approximately 70%) provide space heating and hot water, though a very few (approximately 8%) provide heating, hot water and cooling.⁴
- 2.5 Heat networks form an important part of the UK's plan to reduce carbon emissions and cut heating bills for customers. BEIS considers heat networks to be one of the most cost-effective ways of reducing carbon emissions from heating and highlights that their efficiency and carbon saving potential increases as they grow and connect to each other.⁵ BEIS also notes that heat networks provide an opportunity to exploit larger scale – and often lower cost – renewable and recovered heat sources that otherwise cannot be used.⁶
- 2.6 It is estimated by the Committee on Climate Change that around 18% of UK heat will need to come from heat networks by 2050 if the UK is to meet its carbon targets cost effectively.⁷

¹ [The Heat Network \(Metering and Billing\) Regulations](#), 2014.

² [Experimental statistics on heat networks](#), BEIS, March 2018.

³ [Association of Decentralised Energy](#).

⁴ [Experimental statistics on heat networks](#), BEIS, March 2018.

⁵ [Heat networks guidance](#), BEIS, 4 May 2018.

⁶ [Heat networks guidance](#), BEIS, 4 May 2018. These include facilities which provide a dedicated supply to the network such as Combined Heat and Power (CHP) plants which generate electricity whilst capturing heat that is produced in the process (contrasting with conventional generation where vast amounts of heat are lost) or heat recovered from industry and urban infrastructure, canals and rivers, or energy from waste plants.

⁷ [Next steps for UK heat policy](#), Committee on Climate Change, 13 October 2016.

- 2.7 Given their potential environmental benefits and scope to address fuel poverty, BEIS and the Scottish Government are seeking to expand the number of heat networks significantly over the next decade. We are conscious therefore that the sector is still at an early stage in its development.

Purpose of the study and work undertaken to date

- 2.8 Our market study aims to understand why the heat network sector may not be working well for its customers and to develop proposals to make it work better.⁸

Concerns identified by other organisations

- 2.9 Several organisations have expressed concerns regarding the sector in recent years and made recommendations for reform. Our market study seeks to build on this work.

Which?

- 2.10 In March 2015, Which? highlighted concerns that heat network customers have no opportunity to switch suppliers and no right to redress should service fail to meet expectations. A study conducted by Which? suggested that a significant number of consumers were dissatisfied with their heat network, with cost being a chief concern. Which? noted concerns that consumers may have been mis-sold district heating, confusion about what was included in their bills and frustration regarding poor customer service and complaints handling procedures.
- 2.11 Which? recommended that heat consumers receive clear, transparent price and billing information, that the government look beyond voluntary consumer protection, and that price regulation might be needed.⁹

Citizens Advice

- 2.12 In 2016, Citizens Advice called on the CMA to launch an investigation in the sector with a view to assessing the need for price regulation.¹⁰ Citizens Advice identified a range of concerns regarding heat networks. First, it found that there was very little available data on existing heat networks meaning it was

⁸ Market studies are examinations into the causes of why particular markets may not be working well, taking an overview of regulatory and other economic drivers in a market and patterns of consumer and business behaviour ([Market studies and investigations – guidance on the CMA's approach: CMA3](#), paragraph 1.5).

⁹ [Turning up the heat: getting a fair deal for district heating users](#). Which? March 2015.

¹⁰ [District heating networks – analysis of information request](#). Citizens Advice, January 2016.

difficult for consumers to assess how well they work in practice and whether they offer good value. Second, it noted that there was a wide variation regarding the way in which heat customers are billed for their heat use, also noting that the cost of heat can vary widely due to the age of the scheme. Last, it expressed concerns that consumers have no route to redress if they have problems with their heat supplier.

- 2.13 In May 2017, Citizens Advice published a further report recommending a CMA market study, best practice on billing, improved provision of prepayment meters and new government regulations for consumer protection.¹¹

Citizens Advice Scotland

- 2.14 Similar concerns have been identified by Citizens Advice Scotland, which considers there to be a need for greater consumer protection measures for heat network consumers in Scotland.¹² It identified a number of statutory consumer protection measures that could be introduced through a licence for the supply of heat networks. These included measures around billing, metering, standards of service, access to redress and pricing.
- 2.15 In May 2017, Citizens Advice Scotland recommended to the Scottish Government to introduce price controls and a statutory licence for heat network suppliers covering consumer protection and efficiency standards.¹³

Work undertaken by the CMA to date

- 2.16 Our statement of scope set out three broad themes, which we explored during the course of our market study:
- (a) transparency of information, both prior to moving into a property and during residency;
 - (b) concerns regarding the monopoly supply of heat, the inability of customers to switch and the potential misalignment of the incentives of the builders, operators and customers of heat networks; and
 - (c) outcomes for heat network customers, including prices, service quality and reliability.

¹¹ [District heat networks 2](#). Citizens Advice, May 2017.

¹² The report found that the majority of suppliers interviewed had no plans to join the voluntary Heat Trust scheme.

¹³ [Different rules for different fuels – exploring consumer protection in the district heating market](#). Citizens Advice Scotland, May 2017.

2.17 We received evidence from a wide range of stakeholders through a number of channels:

- (a) Consumer groups, energy service companies (ESCOs), housing associations, trade bodies, the Heat Trust, Ombudsman Services, other industry experts, Ofgem and private individuals responded to our statement of scope. All responses have been published on our website.¹⁴
- (b) We held meetings and calls with stakeholders. In addition to the categories of stakeholder listed above, we engaged with housing developers, consultants advising on heat network design and installation, companies providing customer management services and local authorities.
- (c) We engaged with BEIS, HM Treasury, the Ministry of Housing, Communities & Local Government (MHCLG), the Scottish Government and the Welsh Government.
- (d) We have received a number of complaints about heat networks since launching our market study and have re-examined earlier complaints.
- (e) Consumer groups submitted information to us based on their own research.
- (f) We visited a number of heat networks in England and Scotland.

2.18 In our statement of scope, we stated that our market study will cover the whole of the UK and our intention to focus on heat networks supplying residential rather than commercial customers. We did not receive any submissions challenging this approach.

2.19 We appointed Kantar Public to undertake consumer research as, whilst extensive, the 2017 BEIS Heat Networks Consumer Survey did not focus on the information available to consumers prior to moving into a property with a heat network.¹⁵ Kantar Public's research explored consumers' awareness, understanding and expectations about heat networks before moving into a property (including experiences of information received) and what role heat networks play in consumer decisions to buy or rent a property. We set out the results of the consumer research further in section 6 and published the full report on our case page.

¹⁴ [Responses to statement of scope](#).

¹⁵ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27.

2.20 On 10 May we published an update paper setting out our emerging findings and proposed recommendations. We received over 20 consultation responses, which we reflect in this final report.¹⁶ We also held further meetings and a round table with stakeholders.

Industry background

2.21 In this section, we describe the background to the industry, including the characteristics of customers, the supply chain and delivery models, the role of the planning regime, international experiences of heat networks, existing regulation and ongoing work by others in the sector.

Heat network customers

2.22 Heat networks have features of natural monopolies. Customers have no ability (or, in some cases, limited ability) to switch to an alternative heating system, be it another heat network or a different source of heat as their property may not have a gas supply, electric heating may be too expensive or there may be contractual/price barriers. Heat networks also require a relatively large capital expenditure to build the infrastructure.

2.23 In December 2017, BEIS published the results of a large scale postal survey undertaken to quantify consumer experiences of heat networks in England and Wales for the first time.¹⁷ We have reviewed the underlying data and drawn on this evidence in our assessment.¹⁸

2.24 The BEIS survey found that around two thirds of surveyed customers supplied by a heat network were renting their property from a housing association or a local authority. Only 20% of all heat network customers lived in private accommodation which they owned, compared to 65% nationally. The remaining 11% of heat network customers were renting privately-owned accommodation.¹⁹

¹⁶ [Responses to update paper](#).

¹⁷ Survey responses were received from 5,502 consumers, including 3,716 where the household was as being served by a heat network.

¹⁸ As acknowledged in the BEIS Heat Networks Consumer Survey [technical report](#), there are some limitations to this research. It cannot be said with certainty how representative of all heat network consumers the survey estimates are, as the sample frame used for this survey is not comprehensive. In particular, the coverage of the very smallest heat networks may be lower than that of larger networks. Further, some networks which are non-compliant with the Heat Metering and Billing Regulations may not be included. However, the survey technical report notes that the sample frame used was the best sample frame of heat network customers available at the time.

¹⁹ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 18.

- 2.25 This survey also found that the main difference between heat network customers and the wider population in terms of economic status was the proportion of people who were retired. Over four in ten (44%) heat network customers were retired; the equivalent figure for the wider population was only 14%. The survey also identified that among the heat network population, 40% were classified as vulnerable consumers and roughly a quarter (27%) identified themselves as financially struggling.²⁰
- 2.26 The survey found that heat network customers were much more likely to live in flats or maisonettes, and around half of all heat network customers lived in London.²¹ This is consistent with the fact that, in current market conditions, densely populated areas lend themselves better to district heating due to the infrastructure required to link end users to the heat source.

The supply chain and delivery models

- 2.27 The key elements of a heat network are: (a) the heat source; (b) the pipes used to distribute heat to the dwellings; and (c) the heat interface unit in the dwelling which regulates the flow of hot water and heat.
- 2.28 Heat network delivery consists of two phases:
- (a) the development and construction of the infrastructure (design, build and commissioning); and
 - (b) the operational phase (supply, maintenance and customer management).
- 2.29 In the development and construction phase, for networks supplying new build properties, property developers will usually take responsibility for the design and installation of a heat network as part of the overall construction of the development. After running a commercial tendering process, developers are likely to appoint heat network specialist contractors or general utilities specialists to build the infrastructure associated with the network. Alternatively, developers may appoint an ESCO to take responsibility for design and build.
- 2.30 In the operational phase, a network operator will be responsible for the supply of heat and hot water from the heat source to the end users' homes. This includes ensuring that fuel is supplied, that the heat source is functioning properly and that the distribution network is well-maintained.

²⁰ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 17.

²¹ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 17.

- 2.31 There are two approaches to managing the operation and maintenance of a heat network:
- (a) In most cases, the landlord or property management agent will be responsible for these services and will appoint a specialist operator, who will manage the heat network and bill the landlord or property management company for their services.²² The landlord or property management company, in turn, will be expected to recover these costs from the residents through the management services charge.
 - (b) Alternatively, developers may sign a long-term agreement with an ESCO to operate and maintain the network. These agreements can vary in duration and often include additional services such as design and build or metering and billing services of the network. Freeholders are likely to set minimum performance standards as part of their agreements with ESCOs and ensure that heat supply agreements are provided by the ESCO to all customers.
- 2.32 The method by which heat network customers are managed in relation to metering, data collection and billing varies across networks. These services may be outsourced to a specialist company, or they might be directly managed by the operator of the network.
- 2.33 There are a number of different fuel sources which may be used for a heat network. In March 2018, BEIS published experimental statistics on heat networks, which indicated 90% of heat networks use at least some natural gas as their fuel source.²³ The next most widely used fuel source was electricity (5% of networks) followed by bioenergy and waste (2% of networks). As noted in paragraph 2.5, heat networks provide a future opportunity to exploit larger scale – and often lower cost – renewable and recovered heat sources that otherwise cannot be used.

The role of the planning regime

- 2.34 The planning regime can be a key driver of the development of new heat networks in some parts of the country, where the local / development plan sets requirements over and above Building Regulations.
- 2.35 The approach to planning in the UK is devolved and governed by different primary legislation in each country.

²² This role may be performed by an ESCO.

²³ [Experimental statistics on heat networks](#), BEIS, March 2018.

- (a) In England, planning legislation is encoded in the National Planning Policy Framework, which encourages local planning authorities to adopt proactive strategies to mitigate and adapt to climate change in their Local Plans.²⁴ A small number of local authorities have chosen to set energy and carbon targets that go beyond the minimum set in building regulations. London's planning framework has the most interventionist requirements regarding the installation of heat networks. All developments are required to select energy systems in accordance with a hierarchy, the top of which is connection to existing heating or cooling networks.²⁵
- (b) In Wales, the Planning Policy Wales document states that particular attention should be given to opportunities for minimising carbon emissions associated with the heating, cooling and power systems for new developments.²⁶ This can include utilising existing or proposed local and low and zero carbon energy supply systems (including district heating systems), encouraging the development of new opportunities to supply proposed and existing developments and maximising opportunities to co-locate potential heat customers and suppliers. Again, these requirements are enacted through local development plans.
- (c) In Scotland, the Scottish Planning Policy sets out national planning policies, one of which is carbon reduction. The Policy states that local development plans should support the development of heat networks in as many locations as possible, even where they are initially reliant on carbon based fuels if there is potential to convert them to run on renewable or low carbon sources of heat in the future.²⁷ Where a district network exists or is planned, policies may include a requirement for new development to include infrastructure for connection, providing the option to use heat from the network.

2.36 The role of the planning system in the decisions of property developers as to whether to install a heat network in a development is considered in section 4 below. Further details of the planning system as it relates to heat networks is set out in Appendix D.

²⁴ [National Planning Policy Framework](#), Department for Communities and Local Government, March 2012, paragraph 97.

²⁵ [Decentralised energy in development proposals](#), The London Plan, Policy 5.6.

²⁶ [Planning Policy Wales](#), Edition 9, November 2016, paragraph 4.12.7.

²⁷ [Scottish Planning Policy](#), Scottish Government, June 2014, paragraph 159.

International experiences of heat networks

- 2.37 Heat networks play an important role in supplying heat to customers in a number of countries as part of their decarbonisation strategies.
- 2.38 We spoke to competition and energy authorities in Denmark, Germany, the Netherlands, Norway and Sweden – each of which has adopted different approaches to protecting customers.
- 2.39 We identified a number of themes across the countries we considered:
- (a) Heat networks were often set up as a result of initiatives by municipalities with the aims of reducing carbon and lowering the cost of heat for residents. The planning regime is used to encourage heat networks in some countries and, in most countries, the number of networks is forecast to grow.
 - (b) The public sector plays a key role in providing heat networks in some countries. For example, in Denmark, the majority of suppliers are municipally owned or cooperatives. In contrast, most networks in the Netherlands are operated by private suppliers. Other countries, such as Sweden and Norway, have a mixture of publicly and privately-operated schemes.
- 2.40 In relation to price caps, a number of themes emerged:
- (a) Price caps have been used in the Netherlands (linked to average cost of heat provided by a domestic gas boiler) and in Norway (where the cap is linked to the cost of electrical heating). In Denmark, suppliers are not allowed to charge customers more than the cost of providing heat, which has discouraged private operators from entering the sector.
 - (b) The Netherlands has experienced many challenges in developing price regulation including the heterogeneous nature of schemes, identifying a suitable price comparator for properties with no access to gas and concerns regarding chilling investment in heat networks. Formal regulation has taken ten years to come into force. In the interim period, the largest companies put in place a voluntary tariff cap based on what a comparable customer would pay for gas. Although pricing transparency has improved as a result, most suppliers chose to charge prices close to the maximum tariff and there were cases where prices were lower before the tariff was introduced. Suppliers have also faced difficulties where they have to lower prices when the cost of gas falls, even though they make no cost savings as their networks are not gas powered.

- (c) Sweden, which abolished price regulation in 1996 due to concerns about the impact on efficiency, introduced an initiative to create a transparent framework for discussions between suppliers and customers regarding the principles of heat network pricing.
 - (d) In Germany, concerns about the prices charged to customers on certain networks led to a sector review, resulting in more regular tenders for heat networks, measures to improve transparency of pricing and a number of investigations into excessive pricing by individual networks (which ended in commitments).
- 2.41 Of particular relevance to our consideration of potential remedies were the Dutch and Norwegian experiences of price caps. We also explored the Danish regulatory model and the German approach of taking enforcement action against abusive pricing by individual heat networks.
- 2.42 We provide an overview of the heat network market structure, competition issues and remedies in these countries in Appendix C.

Existing regulation

- 2.43 There is no sectoral regulator with responsibility for heat networks. Heat networks are outside the regulatory remit of Ofgem, the regulator for gas and electricity markets. Accordingly, heat network customers do not automatically benefit from the rights and protections afforded to electricity and gas customers (such as protections for vulnerable consumers and access to an ombudsman). Ofgem has publicly stated its future priorities may include the regulation of heat networks.²⁸

Heat Network (Metering and Billing) Regulations 2014

- 2.44 The Heat Network (Metering and Billing) Regulations 2014 implement the requirements in the Energy Efficiency Directive with respect to the supply of distributed heat, cooling and hot water.²⁹ This includes communal and district heating. They impose various requirements on heat suppliers, including notification of compliance with the regulations to the government.
- 2.45 The regulations also impose billing requirements, namely that bills and billing information are accurate, based on actual consumption and compliant with minimum requirements (unless this would cost more than £70 per final

²⁸ [Forward work programme 2018-19](#), Ofgem, 28 March 2018.

²⁹ [Directive 2012/27/EU](#), 25 October 2012. The Heat Network (Metering and Billing) Regulations cover both district and communal networks.

customer, per calendar year). As a minimum, the bill must contain energy prices, the customer's energy consumption, a price comparison where available and supplier contact information.

- 2.46 The regulations also require that all new heat network customers must be given a heat meter. Installation of meters for existing customers is subject to technical feasibility and a cost effectiveness test; the methodology for which is subject to a forthcoming consultation.

The Heat Trust

- 2.47 The Heat Trust was launched by industry participants in 2015 and sets out a common standard in the quality and level of customer service that communal and district heating suppliers should provide their customers.³⁰ It also provides free independent redress through the Energy Ombudsman for settling unresolved complaints between customers and their heat supplier.
- 2.48 The Heat Trust scheme includes rules on the following: support for vulnerable heat customers; heat supplier obligations; heat customer service and reporting a fault or emergency; heat bill and heat charge calculations; heat bill payment arrangements and the management of arrears; and heat meters and interface units.
- 2.49 The Heat Trust has launched an online price comparison tool for heat network customers to provide an indication of the heating costs for a similar sized property with a modern gas boiler. Membership of the scheme is voluntary, although those in receipt of capital funding from BEIS³¹ are required to sign up to the Heat Trust or demonstrate equivalent standards. To date, only around 50 networks (with a total of around 30,000 customers) have signed up, but these include most of the largest networks constructed since the Heat Trust was set up.

Heat networks code of practice

- 2.50 In relation to technical standards, the ADE and Chartered Institution of Building Services Engineers (CIBSE) have created a heat networks code of practice which sets standards covering the design, build and operation of communal and district heating networks together with suggested best

³⁰ The [Heat Trust Scheme](#) is operated by Heat Customer Protection Ltd which is a not for profit company limited by guarantee. It is sponsored by the ADE.

³¹ [Heat Networks Investment Project](#) grants and loans.

practice.³² This is a voluntary code and does not yet have a compliance or quality assurance scheme.

Ongoing work by others in the sector

UK Government

2.51 BEIS is working to increase the number of heat networks in England and Wales as part of the government's plan to reduce carbon and cut heating bills for customers:

(a) The Heat Networks Investment Project (HNIP) is delivering £320m of capital investment support to increase the volume of heat networks construction, in turn delivering carbon savings and helping to create the conditions for a sustainable market that can operate without direct government subsidy. The programme is expected to support up to 200 projects by 2021.³³ The projects that the government supports through the Heat Network Investment Project must meet Heat Trust equivalent standards, as well as meet minimum technical standards in terms of performance and efficiency of systems.

(b) The Heat Networks Delivery Unit was established in 2013 to address the capacity and capability challenges which local authorities identified as barriers to heat network deployment. The unit provides funding and specialist guidance in early development stages.

2.52 In order to encourage investment in heat networks BEIS has published a heat networks investment guide,³⁴ a pipeline of district heating projects in development in England and Wales³⁵ and a list of investors interested in heat network opportunities.³⁶

2.53 BEIS is considering options for consumer protection in England and Wales in the future and we are engaging with both BEIS and Ofgem in this area.

³² [CP1: Heat Networks: Code of Practice for the UK](#).

³³ [Heat Networks Investment Project guidance](#), BEIS. 7 April 2017.

³⁴ [Investing in the UK's heat infrastructure: Heat networks](#).

³⁵ [HNDU Pipeline](#).

³⁶ [Heat Networks Investor List](#)

The Association of Decentralised Energy

- 2.54 The Association of Decentralised Energy (ADE) launched an industry task force in March 2017 to examine how best to address the issues of driving investment in heat networks and ensure customer protection.
- 2.55 The task force published its report in January 2018.³⁷ The overarching recommendation was that a regulatory framework that reduces investor risk was needed. Unlike other utilities which have a national network and near national customer base heat networks must, as well as establishing generation, find sufficient customers to pay for putting the initial pipes in the ground. Investors term this ‘demand risk’. The report made several specific recommendations, including the following:
- (a) There should be a regulatory solution to address demand risk and ensure consumer protection.
 - (b) It should also allow for the separation of network assets into separate entities (eg generation, distribution and supply) to allow greater competition and accountability and the introduction of a variety of investment models.
 - (c) The demand assurance should allow future expansion. Developers should be required to produce a strategic plan for the phased development of a heat network.
 - (d) A network operator should have a revenue cap and floor. There was significant debate over a potential price control for heat network customers. The task force concluded that, at this stage, the price control should only apply to the primary pipe network receiving the demand assurance. Other options for ensuring a fair final price, such as competition and transparency, should be explored as alternatives to an end customer price cap.
 - (e) New heat networks with access to demand assurance should meet customer protection standards and offer free access to an ombudsman. Heat Trust membership should be sufficient to demonstrate that services standards are being met. There should be a clearer complaints process with independent review. Regulatory mechanisms should be put in place for the appointment of a heat supplier of last resort, where the original

³⁷ [Shared warmth: a heat network market that benefits customers, investors and the environment](#), ADE industry heat network task force report, 31 January 2018.

heat supplier is no longer able to meet its contractual obligations, together with a special administration regime.

- (f) A standard methodology for the elements that can be included in heat network tariffs should be developed by a regulator, together with industry and applied across heat networks with access to demand assurance. Heat networks with access to demand assurance should also be required to submit data to a third party to allow cost comparison with other heat networks. The regulatory framework should ensure that all customers have access to clear information on all aspects of being a heat network customer.
- (g) Industry and government should continue to work together to develop a heat network technical compliance scheme.

2.56 We are continuing to engage with the ADE in relation to our market study.

Heat networks in the devolved nations

2.57 Our market study covers the whole of the UK. We are considering the provision of heat networks in England and each of the devolved nations.

2.58 We have engaged with each of the devolved nations in the course of our study to date and included information from each nation in our analysis. We summarise the current policy positions regarding heat in each nation below.

Scotland

2.59 Heat policy is devolved to the Scottish Government.³⁸ In 2015, the Scottish Government published a Heat Policy Statement setting out how low carbon heat can reach more householders, business and communities and a framework for investment in the future of heat in Scotland.³⁹ The ambition is to achieve 1.5 TWh of Scotland's heat demand to be delivered by district or communal heating and to have 40,000 homes connected by 2020.

2.60 The District Heating Loan Fund offers loans to support the development of district heating networks in Scotland. The scheme is available to provide loans

³⁸ Heat is not referred to in Schedule 5 of the Scotland Act 1998, in which section 'Head D – Energy' reserves energy powers to the UK, or elsewhere in the Act. As such, heat policy is not reserved to the UK. The UK Government recognised that heat policy is devolved in its analysis for the Smith Commission and also recognised the devolved competence of Scottish Ministers in relation to regulation of heat networks in Scotland, including in the Heat Networks (Metering & Billing) Regulations 2014.

³⁹ [The Heat Policy Statement: Towards Decarbonising Heat: Maximising the Opportunities for Scotland](#), Scottish Government, 11 June 2015.

for both low carbon and renewable technologies in order to overcome a range of infrastructural issues and costs of developing these projects.

- 2.61 In January 2017, as part of the broader Scottish Energy Efficiency Programme, the Scottish Government published a high level policy scoping consultation paper on Local Heat and Energy Efficiency Strategies (LHEES) and the regulation of district and communal heating.
- 2.62 In November 2017, the Scottish Government consulted on more specific proposals for LHEES and regulation of heat networks in Scotland.⁴⁰ In relation to the regulation of heat networks, the Scottish Government is considering the following proposals:
- (a) Local authorities would have a statutory duty to develop LHEES, which would include identifying areas that would be appropriate for district heating.
 - (b) Planning authorities would continue to have their existing discretionary powers to encourage the infrastructure needed to make connections to district heating, with future versions of the Scottish Planning Policy having regard to Scottish Government strategies and requirement on district heating.
 - (c) Developers would need to obtain a district heating consent, which would have conditions including the requirement to have a licence and meet licensing conditions. The Scottish Government is exploring how a dispute resolution mechanism, potentially including an ombudsman, could be incorporated into a licensing system.
 - (d) Developers would need to obtain a licence, issued by a national body, to develop and/or operate a heat network, in addition to holding a district heating consent. The licence would ensure technical and operational quality standards, network compatibility and would codify existing UK-wide consumer protection frameworks.
 - (e) To ensure that potential heat users have access to relevant information, the Scottish Government will seek to improve the provision of information to district and communal heating customers in Scotland by making amendments to the Recommendations Report of Energy Performance Certificates (EPCs).

⁴⁰ [Scotland's Energy Efficiency Programme: Second Consultation on Local Heat & Energy Efficiency Strategies, and Regulation of District and Communal Heating](#), Scottish Government, 14 November 2017.

- (f) Smaller scale projects may be required to become Heat Trust members (currently only large-scale schemes receiving Scottish Government support are required to join).
- 2.63 As set out in Schedule 5 of the Scotland Act 1998, there are specific matters over which the Scottish Parliament cannot legislate, including reservations in relation to competition and the regulation of consumer protection. The Scottish Government is therefore considering how recommendations regarding the future regulation of heat networks can be implemented, including through pressing for further devolution of powers.
- 2.64 We are engaging with the Scottish Government and have visited a number of stakeholders in Scotland. In particular, we are discussing the issues that have arisen in Scotland and the applicability of our proposed remedies to Scotland with a view to ensuring that all heat customers in the UK benefit from consistent remedial action.

Wales

- 2.65 Energy policy is not devolved to Wales. However, whilst the Wales Act 2017 reserves heat and cooling policy including the regulation of the heat supply industry and the Renewable Heat Incentive, it devolves to the Welsh Assembly the power to incentivise local heat networks and renewable heat schemes.⁴¹ Wales is participating in the Heat Networks Investment Project and is in receipt of funding from the Heat Networks Delivery Unit.
- 2.66 A lower proportion of residents in Wales are supplied by heat networks compared to the UK overall. The Welsh Government considers that heat networks are not yet more prevalent in Wales partly due to its rural nature (heat networks are currently more suited to areas of denser population). Heat networks are mainly operated by local authorities as part of a wider strategy to address fuel poverty and deliver decarbonisation (which includes finding low carbon sources of power for networks, such as waste).
- 2.67 In the area of consumer protection, the Welsh Government is considering options for providing more detailed advice for potential heat network customers. We are continuing to engage with the Welsh Government in relation to our study.

⁴¹ [Wales Act 2017](#), Section D5 – Heat and cooling.

Northern Ireland

2.68 There are only a small number of networks in Northern Ireland.⁴² There are no current plans to significantly expand the number of heat networks. We have engaged with the Northern Ireland Authority for Utility Regulation, the Department for Communities and the Department for the Economy in relation to the study.

Structure of the paper

2.69 The paper sets out our findings and recommendations.

2.70 First, we examine outcomes for heat network customers, including price, service quality and reliability.

2.71 Second, we examine the drivers of these outcomes, including:

- (a) The extent to which the incentives of heat network property developers, heat network operators and customers are aligned, including whether developers and property freeholders are incentivised to minimise up-front capital expenditure costs leading to higher repair, maintenance and operating costs for customers in the longer term.
- (b) The monopoly supply of heat networks and two key delivery models.
- (c) The transparency of information available to potential heat network customers both prior to moving into a property and during residence.

2.72 Third, we make recommendations for remedial action in each of these areas.

⁴² There are currently 94 heat networks in Northern Ireland that notified to BEIS. 54 supply residential dwellings and only one network supplies more than 100 dwellings. Nearly all the heat networks in Northern Ireland are communal heating. The Department for the Economy is working with BEIS in the amendment of the Heat Metering and Billing Regulations 2014 and the recast of the Energy Efficiency Directive to ensure the regulation of any future networks in NI.

3. Outcomes for heat network customers

Introduction

- 3.1 In this section we consider outcomes for heat network customers, including prices, reliability, service quality, and overall customer satisfaction. The statement of scope suggested that monopoly supply and supply chain incentives may mean that heat network providers face little competitive pressure to offer reasonable prices, reliable supply and high quality of service.
- 3.2 We have considered evidence from a variety of sources – both existing work by other organisations and new CMA research.

Heat network prices

- 3.3 There is very little public information available concerning the prices paid for heat by heat network customers. The diversity of types of scheme (in particular differences between metered and unmetered schemes), and charging structures, may hamper comparability between schemes.

Assessment of prices charged by heat networks

Evidence from other sources

- 3.4 The BEIS survey (described in paragraph 2.23) collected data from consumers about their heating bills. Average charges varied according to a number of factors including property size – those in larger homes paid larger bills on average.
- 3.5 For heat network consumers who had their bills in front of them, the median charge was £440. Median annual charge for such consumers was highest among:
- (a) Local authority run schemes (median charge of £620 per year compared with £430 per year in privately-operated schemes and £310 in housing association schemes;
 - (b) District schemes (median of £510 compared with £400 in communal schemes).
- 3.6 The BEIS survey noted:⁴³

⁴³ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 4.

‘There is evidence of great variation in pricing in the heat network sector, with pockets of heat network consumers paying high annual prices, including consumers paying more than £1,000, or even £2,000, per year.’

- 3.7 Which? collected price information on 51 district heating schemes operated by 22 different heat suppliers. Using an estimate of typical heat demand, Which? estimated that average annual bills for metered customers were between £339 and £919, with an average of £679 (which it estimated as equivalent to 11.04 p/kWh).⁴⁴ For unmetered schemes, based on costs apportioned to a two-bedroom property, Which? found that consumers paid £771 a year on average.⁴⁵ Which? noted the challenges of comparing prices across schemes given a general lack of consistency across schemes in relation to how heating costs are calculated.

CMA supplier questionnaire

- 3.8 Using a questionnaire sent to a sample of heat suppliers, we aimed to generate broadly representative unit prices (p/kWh) and annual heat charges, that are comparable across networks. We compared these prices and charges against an estimate of the costs of owning and operating an individual household gas boiler.
- 3.9 To generate data for our pricing analysis, we selected a random sample of 102 heat suppliers.⁴⁶ The sample was drawn from the population of heat suppliers identified on the regulatory database held by BEIS (containing notifications made under the Heat Network (Metering and Billing) Regulations 2014).
- 3.10 Questionnaires were sent out in December 2017 and January 2018.⁴⁷ Full details of the CMA’s supplier data collection exercise and analysis are set out in Appendix A.

⁴⁴ [Turning up the heat: getting a fair deal for district heating users](#). Which? March 2015, page 15.

⁴⁵ [Turning up the heat: getting a fair deal for district heating users](#). Which? March 2015, page 18.

⁴⁶ We initially randomly selected 100 heat suppliers. Since none of these operated schemes located in Northern Ireland, we then added a further two suppliers operating schemes located in Northern Ireland (which were selected randomly from among those in Northern Ireland).

⁴⁷ Of the original 102 heat suppliers we sent questionnaires to 86 heat suppliers. Some suppliers were not sent questionnaires because: the heat network or building had been removed after notification; the original notification had been made in error; the heat supplier only supplied cooling; or we could not identify an appropriate contact to send the questionnaire to. During the market study we found that four of the heat suppliers that had received a questionnaire could not respond because they were found not to be in scope (eg they only heated communal areas) or had been incorrectly identified as the heat network operator. We therefore sent questionnaires to 82 relevant heat suppliers (or their representatives).

- 3.11 Our questionnaire requested information on the total heat supplied to domestic dwellings by each network in 2016,⁴⁸ the total charges made relating to heat, and the number of dwellings connected to the network. This enabled us to estimate average unit (per kWh) prices, average heat bills, and average heat usage per dwelling for each network. We also requested a range of information on the characteristics of each heat network and the dwellings that they serve.
- 3.12 We have received completed questionnaires from 68 heat suppliers, covering 445 heat networks and over 22,000 dwellings. Although we did not receive responses to all our questionnaires, we consider that our sample of heat networks is likely to be broadly representative of the current wider population of heat networks.⁴⁹
- 3.13 The main characteristics of our sample are as follows.
- (a) Dwellings are predominantly flats (94%) and have two or fewer bedrooms (86%);
 - (b) Most (around 75%) were more than 10 years old (ie pre-2006);
 - (c) 79% are communal schemes (accounting for 56% of dwellings); 21% district heating schemes (44% of dwellings);
 - (d) Only 13% of networks and 27% of dwellings are metered (where individual heat charges directly relate to individual heat consumption);
 - (e) Almost exclusively operated using natural gas boilers;
 - (f) Median of 31 dwellings per network, with three quarters of schemes supplying fewer than 45 dwellings; and
 - (g) Most (around 65%) heat suppliers in our sample are private operators, but many operate only a single network, whereas non-profit and local authority suppliers are often responsible for multiple networks. Hence only 12% of networks in our sample are operated by private entities.
- 3.14 The age profile of networks in our sample implies that observations relating to the whole sample may not be representative of new and future networks.

⁴⁸ Or for the financial year 2016/17 if this was more readily available.

⁴⁹ Although we found that our sample contained a lower proportion of the very smallest heat networks (such as those supplying fewer than 10 dwellings) than those contained in the BEIS database. We also found some evidence of homogeneity within the heat networks operated by some large heat suppliers. For instance, some heat suppliers charge a comparable price per unit for heat across each of their networks. This could limit our ability to draw inferences to the wider population since the largest 11 heat suppliers account for around three quarters of heat networks in the sample. See Appendix A for further information.

Similarly, the preponderance of gas-fuelled heat sources may mean that our sample does not reflect more diverse (lower carbon) future fuel sources.

- 3.15 Some respondents to our consultation questions also noted that our overall sample may be unrepresentative of new and future networks. It was suggested that we should be cautious in using analysis largely based on older networks to establish views on future networks, which may be different both technically and commercially.
- 3.16 There were certain limitations with the data received, and assumptions required in processing results, which are described in more detail in Appendix A. For instance, a majority of heat suppliers could not provide accurate information on the amount of heat supplied, meaning that this had to be estimated from data on fuel used or heat generated (using assumptions such as about the efficiency of the boiler). Therefore, caution should be applied when interpreting the data, and in particular individual data points on unit prices.
- 3.17 Unit prices calculated from the data submitted varied significantly, with an interquartile range of 3.9 p/kWh to 7.8 p/kWh. The weighted average (mean) unit price (incorporating both fixed/standing charge and variable elements) for schemes in our sample was 6.0 p/kWh, and the median 4.8 p/kWh.
- 3.18 It is also useful to consider data from our sample on average annual heat charges per dwelling. This is not subject to uncertainties around accurate estimation of heat supplied, but does ignore differences in dwelling size and type, which would be expected to impact on heat usage and bills. In our sample the mean annual charge was £420, and the median was £366. The range of estimated average bills had an interquartile range of £225 to £570.
- 3.19 We note that unit prices and average bills vary significantly between schemes in our sample. Some of this variation simply reflects variation in average heat usage and the consequent impact of fixed or standing charges.

Overall comparison of prices with gas comparators

- 3.20 We noted in our statement of scope that we would investigate whether heat networks can be more expensive for consumers than alternatives, in particular mains gas heating.⁵⁰ Because both heat networks and gas heating can involve both standing and variable charges, unit prices for both can vary

⁵⁰ Around 85% of households (22 million out of 26 million) in Great Britain use mains gas for heating. [Insights paper on households with electric and other non-gas heating](#), Ofgem, 11 December 2015.

significantly according to household heat demand. We constructed two benchmark 'gas comparators' for each level of heat usage, based on the typical costs incurred by a customer owning and operating an individual household gas boiler.⁵¹ Importantly, the comparators include elements relating to the costs of owning and maintaining a boiler as well as the household's costs of purchasing gas (hence total costs expressed in p/kWh terms will tend to significantly exceed those typically seen in gas tariffs).

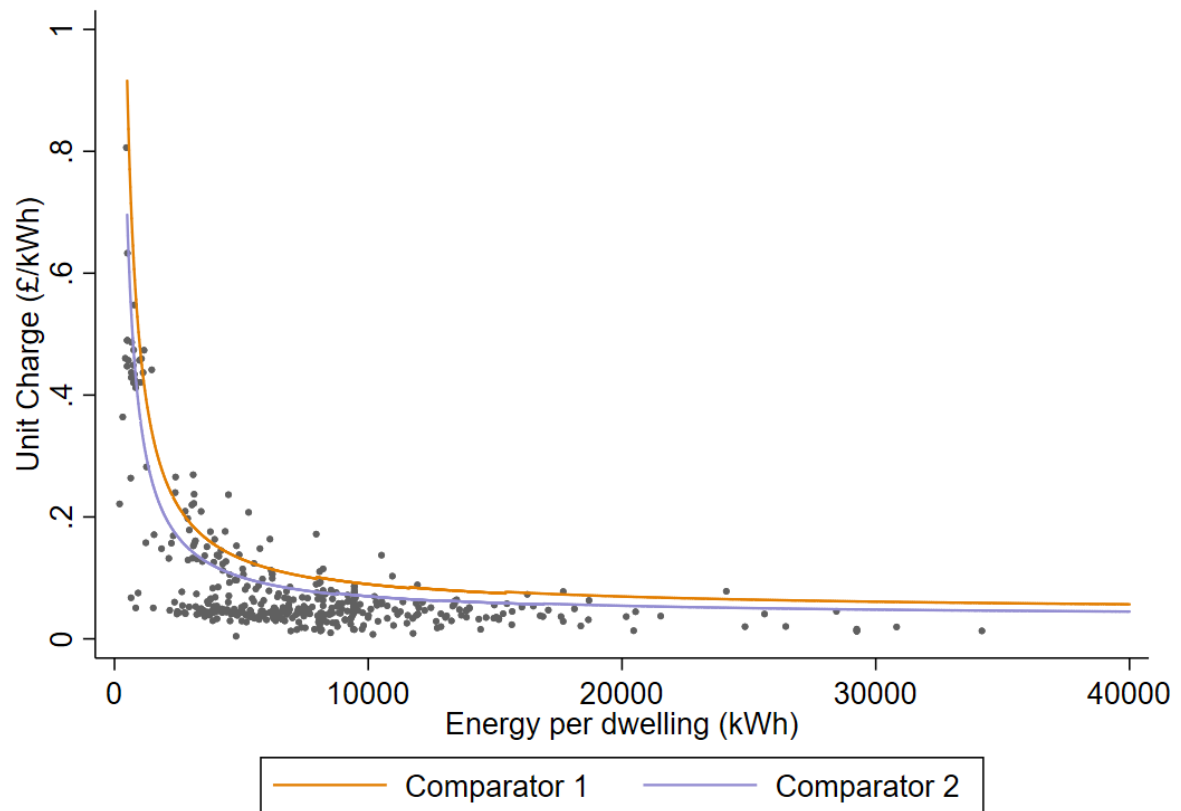
- 3.21 We consider that we have used a relatively generous benchmark for our first comparator ('Comparator 1') – for example, we have used a measure of average gas prices paid, rather than the lowest tariffs available. The assumptions we have used are broadly in line with those used for the Heat Trust's 'Heat Cost Calculator'.⁵²
- 3.22 We have also estimated another gas comparator ('Comparator 2') based on a number of lower underlying cost assumptions. For example, Comparator 2 uses assumed gas prices around 14% below the average paid prices used in the baseline comparator.
- 3.23 Figures 1 and 2 below set out:
- (a) The average unit price per kWh of heat and average heat usage (kWh) per dwelling for each network,⁵³ and the gas comparator prices for each level of heat usage.
 - (b) The average annual heat charge and average heat usage (kWh) per dwelling for each network, and the gas comparator charges for each level of heat usage.

⁵¹ The details of our calculations and assumptions made are set out in Appendix A.

⁵² [Heat Trust heat cost calculator](#).

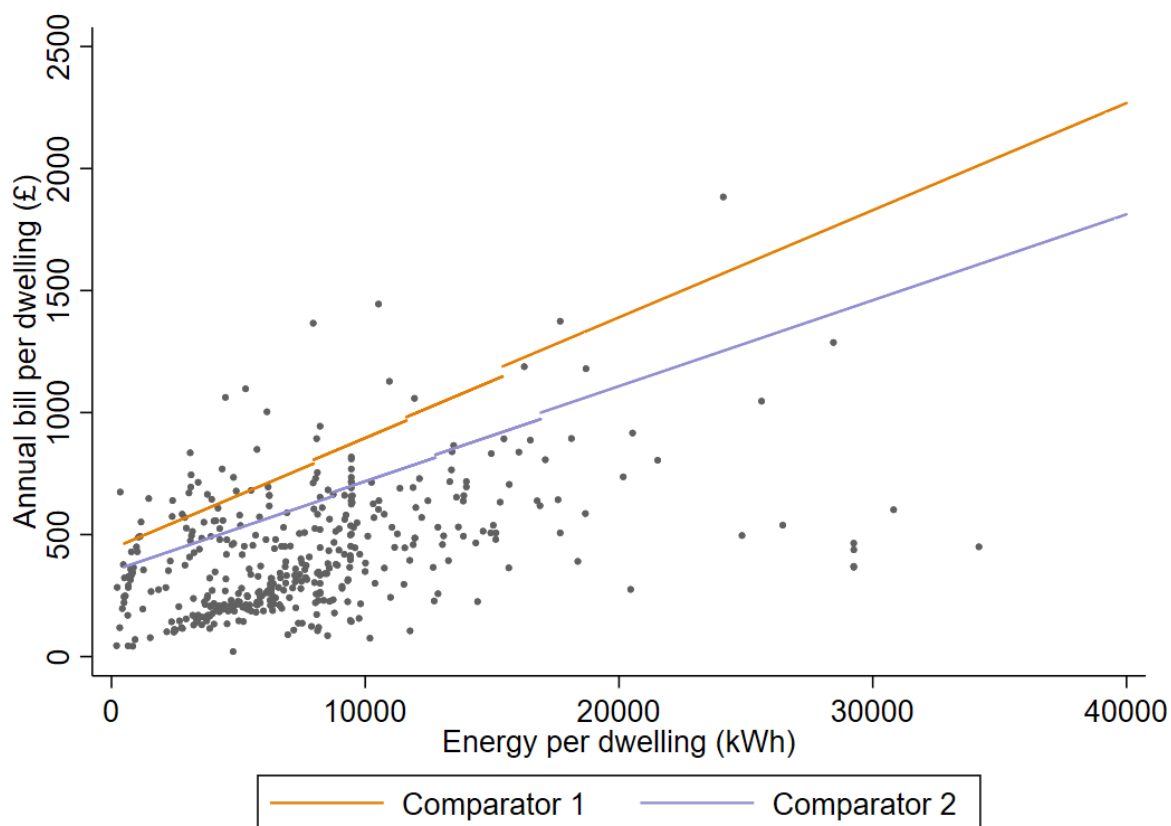
⁵³ That is, each dot on the charts represents a separate network.

Figure 1: Average unit price per kWh of heat and average heat usage (kWh) for each network, and the gas comparator prices for each level of heat usage



Source: CMA analysis of responses to supplier questionnaire. See Appendix A Figure 3 for further details.

Figure 2: average annual heat charge and average heat usage (kWh) for each network, and the gas comparator charges for each level of heat usage



Source: CMA analysis of responses to supplier questionnaire. See Appendix A Figure 4 for further details.

- 3.24 Overall, these charts indicate that average prices on the large majority of heat networks within our sample are close to or lower than the price of the gas comparators.
- 3.25 A large proportion of networks, 53% (and 52% of dwellings), were charged an average price per unit and annual heat charge that was less than half the level of Comparator 1. A further 27% of networks (and 24% of dwellings) had unit prices between 25% and 50% lower than Comparator 1. Only 8% of networks had unit prices above Comparator 1. 6% of networks (and 6% of dwellings) were charged over 10% more, and 3% of networks charged over 25% more than Comparator 1.
- 3.26 17% of networks had unit prices above Comparator 2 for their relevant volume of heat usage per dwelling, with 13% of networks charging over 10% more than Comparator 2.

- 3.27 It is important to note that our gas comparators do not necessarily reflect the alternative cost that heat network consumers would actually face, particularly where gas central heating is not the most likely alternative. They are also not intended to reflect the price that would prevail in a competitive heat network market. In particular, the costs of building and operating a heat network may differ greatly from those of alternative sources of heat, depending (among other things) on the types of property involved and the size of the heat network. However, we consider that the comparison gives an indication of whether heat networks are offering value for money for consumers.
- 3.28 Respondents to our consultation generally agreed that an individual gas boiler comparator was a reasonable starting point for benchmark comparisons. It was noted that for high-rise developments the most likely alternative (to a heat network) would be electric heating. Some respondents questioned whether individual gas boilers will remain an appropriate reference point in the future, given the emphasis on decarbonisation of heat.
- 3.29 Several respondents emphasised that comparisons should be done on a like-for-like basis, reflecting the whole lifecycle costs of each technology.⁵⁴

Assessment by type of heat network

- 3.30 We have examined whether there is evidence from our sample of systematically higher prices and annual charges on any particular types of heat network. We therefore examined how network prices vary according to:
- (a) Types of owners/operators of scheme (private⁵⁵; non-profit⁵⁶; local authority).
 - (b) Size of network (number of dwellings; total residential heat supply; total heat supply to all end customers).
 - (c) District heating or communal network.
 - (d) Whether dwellings are individually metered or not.
 - (e) Age of the network.

⁵⁴ It was also suggested by one respondent that inclusion of elements relating to the costs of owning and maintaining a boiler may be less valid for rented properties, for which such costs would be included in the rent.

⁵⁵ Defined as including: privately-owned estates, resident associations; property management companies.

⁵⁶ Defined as including housing associations, registered charities, almshouses, and other social housing providers, but for these purposes *excluding* Local Authority operated networks, which are considered separately.

3.31 We found that, within our sample, higher unit prices and charges were associated with:

- (a) Private networks⁵⁷ (27% of privately-operated networks had prices higher than gas Comparator 1, and 50% had prices higher than Comparator 2). Median price per unit for these schemes was 7.8 p/kWh, and median annual charge £562;
- (b) Individually metered schemes⁵⁸ (16% of metered schemes had prices higher than Comparator 1 and 31% had prices higher than Comparator 2). Median price per unit for these schemes was 7.7 p/kWh, and median annual charge £479.

Privately-operated networks in our sample were substantially more likely than average to be individually metered, and vice versa, so these observations may be driven by some of the same factors.

3.32 In Appendix A, we present charts of prices by type of heat network operator and, separately, for metered and unmetered schemes.

3.33 We note that our overall findings are consistent with those of BEIS and Which?, in that average heat network charges (and unit prices) vary significantly between networks. However, there are also some differences in relation to findings which compare different types of scheme.⁵⁹

Findings on the prices charged by heat networks

3.34 Our research indicates that unit prices and average bills vary significantly between schemes. This is consistent with other external research, and in part is likely to reflect large variations in average heat usage, and the relationship between heat usage and the impact of standing charges on unit prices. Overall, average prices on the large majority of heat networks within our sample are close to or lower than the price of a gas heating-based comparator.

3.35 We did observe some differentials in price distributions between different types of scheme in our sample. In particular, higher unit prices and annual charges were associated with privately-operated schemes, and individually metered schemes.

⁵⁷ 52 private networks in our sample.

⁵⁸ 61 individually metered schemes in our sample.

⁵⁹ For example, the BEIS survey reported higher median charges for consumers on local authority run schemes than for those on privately-operated schemes, for those respondents with their bills in front of them when completing the survey.

- 3.36 Some networks may be offering poor value for money to heat customers. We cannot tell from our data whether specific examples of high prices and bills relate to schemes with particularly high (fixed or operational) costs, or whether some heat suppliers are applying significant mark-ups over cost (see paragraphs 5.6 to 5.20).

Heat network quality

- 3.37 We have considered quality of service under the following three broad themes: overall satisfaction; technical service quality (eg reliability of heat and hot water provision, issues with overheating, etc); and other measures of service quality (eg quality of information, billing, responses to complaints). The BEIS survey findings enable us to compare some of these aspects against experiences of domestic customers who are not on heat networks.
- 3.38 We summarise our findings below. Further detail is set out in Appendix B.

Overall satisfaction

- 3.39 The BEIS survey indicated that heat network customers were broadly as satisfied with their heating system as non-heat network customers. 74% of heat network customers were either 'satisfied' or 'very satisfied' (72% for non-heat network customers). 13% of heat network customers were either 'dissatisfied' or 'very dissatisfied' (14% for non-heat network customers).
- 3.40 More detailed analysis found that among heat network customers, the key drivers of satisfaction were: the reported reliability of the system; the perceived fairness of price; satisfaction with the level of information provided about their system; experience of under- or over-heating; and satisfaction with the handling of complaints.

Technical service quality

Evidence from BEIS survey

- 3.41 In relation to reliability, the results of the BEIS survey suggested that both heat network customers and customers not on heat networks view their service as reliable. 93% of heat network customers and 90% of customers who were not on heat networks said their heating system was either 'very reliable' or 'fairly reliable'.⁶⁰

⁶⁰ BEIS Heat Networks Consumer Survey, BEIS research paper Number 27, Figure 2, page 31.

- 3.42 The BEIS survey showed that a greater proportion of heat network customers had experienced a loss of heating in the last 12 months (37% compared to 24% of customers not served by a heat network). Of those who had experienced loss of heating, heat network customers were also more likely to have experienced multiple outages. Of heat network customers, those on local authority operated networks were most likely to have experienced heat loss.⁶¹
- 3.43 The survey indicated that heat network customers have less control over their level of heating than customers who are not on heat networks.⁶² It also indicated that heat network customers were more likely to report over-heating than those not on heat networks (39% and 21% respectively reporting that their home had been uncomfortably warm in the past).⁶³ In contrast, only 16% of customers on heat networks stated that their home ever got uncomfortably cold, compared to 29% of customers not served by heat networks.⁶⁴ Overall, customers' satisfaction with their ability to control their level of heating was effectively the same for customers on heat networks and those who are not.⁶⁵

Findings from the CMA supplier questionnaire

- 3.44 Our questionnaire to heat suppliers asked about the incidence of interruptions to supply. Our results broadly fit with the findings of the BEIS survey: we found that 32% of all networks in our sample had experienced an interruption to the supply of heating and/or hot water in 2016.
- 3.45 Responses indicated that private and local authority operated networks in our sample were significantly more likely (52% and 39% respectively) to have experienced an interruption to service than other non-profit schemes (27%). Responses also indicated that district heating schemes in our sample were more likely to have experienced an interruption than communal schemes.

Evidence from submissions and complaints made to the CMA

- 3.46 Reliability concerns are a consistent theme of consumer complaints to the CMA, with over half of those complaints analysed so far referring to supply concerns. In particular, most of those complaints that refer to service quality refer to unplanned interruptions. Less frequently mentioned concerns include excessive noise, insufficient heat or hot water and malfunctioning meters.

⁶¹ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 38.

⁶² [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 39.

⁶³ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 32.

⁶⁴ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 34.

⁶⁵ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 40.

Several of the complaints emphasise that the loss of hot water and heat can have a severely detrimental effect on everyday life.

- 3.47 Reflecting the importance of the reliability of utilities for everyday life, consumer groups have also emphasised the importance of reliability in our meetings and in their responses to the statement of scope.⁶⁶ This evidence suggests that when heat problems occur they can create significant dissatisfaction and distress to those consumers affected, and potentially risks to health (particularly amongst vulnerable groups).

Other measures of service quality

Evidence from BEIS survey

- 3.48 The BEIS survey identified that customers on heat networks were less likely to receive bills, account summaries or statements detailing their charges for heat and hot water than those who were not on heat networks. The survey showed that 62% of customers on heat networks received this type of information about charges, compared to 81% of customers who were not on heat networks.⁶⁷ Customers on heat networks were also slightly less likely than customers not on heat networks to have received information about the type of heating system they have (41% compared to 47%). However, customers on heat networks were more than twice as likely as customers not on heat networks to have received information about the likely cost of their heating (20% compared to 9%).⁶⁸
- 3.49 A slightly higher proportion of customers on heat networks had made a complaint about their heating system in the last year (22%) than customers not on heat networks (18%).⁶⁹ This difference was driven by complaints from those heat network customers on private and local authority schemes.⁷⁰ In addition, of those who had made a complaint, customers on heat networks tended to be less satisfied with how the complaint was handled than customers not on heat networks: only 45% of customers on heat networks who made a complaint were either 'satisfied' or 'very satisfied' with how their

⁶⁶ For example, see [Fuel Poverty Action's response](#) and documents referred to in the response.

⁶⁷ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 43.

⁶⁸ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 60.

⁶⁹ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 63.

⁷⁰ Proportions of heat network customers who had complained, by network type, were: Private 25%; Local authority 25%; Housing association 18%. Source: [BEIS/Kantar Data tables](#), Q35.

complaint was handled, compared to 56% of customers not on heat networks.⁷¹

Findings from CMA (Kantar Public) qualitative research

3.50 Overall experiences were mixed, but issues raised by those with negative experiences included the following:⁷²

- (a) Some respondents had experienced disruption to their heating supply, with some experiencing recurring disruptions or disruptions that lasted for several days. Some respondents felt these disruptions were not resolved in a timely manner.
- (b) Some respondents reported receiving bills at irregular intervals, often with large gaps in between, resulting in some very high bills. Others had not received expected billing statements and were not able to access their past statements.
- (c) After encountering issues and contacting their suppliers, some respondents found customer service to be poor in terms of the nature of interactions, inconsistency of information provided, and difficulty in finding the right person to speak to.

Evidence from submissions and complaints made to the CMA

3.51 A significant proportion of the complaints to the CMA analysed so far refer to concerns about billing. About one third of complaints refer to irregular bills, a third complain about inaccurate bills, and a significant proportion complain about being billed for heat consumption when they believe that they are not using so much heat, or any heat and hot water. It is important to note the depth of feeling in such complaints because such consumers feel unable to plan or control their outgoings, and they feel strongly that it is unfair to be charged for heat which they believe that they are not using, or when a meter appears to be malfunctioning.

3.52 Around one half of complaints analysed so far refer to unresponsive or insufficient customer service. These complaints include concerns around the hours that customer agents are available and how rapidly interruptions and other issues are addressed. This is important because consumers expect heat and hot water to be available when they need it. On some networks there are complaints about the different businesses involved in the heat network

⁷¹ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 64.

⁷² Pages 19-20, Kantar Public, [Qualitative Research: Heat Networks](#).

passing the responsibility for problems between themselves. Thus, resolving issues can be very time consuming for residents as they feel no one will take responsibility.

- 3.53 Consumer groups have emphasised concerns over back billing. Infrequent and unpredictable bills make financial planning difficult for consumers and this can be very detrimental to many of those affected.

Findings on quality

- 3.54 Overall customer satisfaction (and dissatisfaction) of heat network customers is in line with the wider population of consumers not on heat networks. Heat network customers in the BEIS sample reported higher incidence of interruptions than non-network heating, and less control over heating. Taking the BEIS and CMA findings together, customers of private and local authority schemes appear most likely to experience a loss of heating. Some concerns have been identified through various sources relating to customer access to information about their heating, frequency and content of bills, and consumer redress.
- 3.55 Where problems do arise with specific schemes, there is limited consumer protection and redress, and may be issues with accountability. Heat network customers do not have the same regulated customer protections as domestic gas and electricity customers.⁷³

The drivers of price and quality outcomes for heat network customers

- 3.56 In the following sections, we consider the key drivers of outcomes for heat network customers in relation to price and quality:
- (a) Section 4 – the consideration of end customer interests in the design and build of heat networks.
 - (b) Section 5 – monopoly supply and delivery models.
 - (c) Section 6 – transparency regarding heat networks before moving into a property and during residency.

⁷³ Other than those which are covered by landlords' general responsibilities under the Landlord and Tenant Act (1985) to provide reliable heating and hot water.

3.57 In section 7 we set out options for remedial action to address the concerns that we have identified.

4. The design and build of networks

Introduction

- 4.1 In most cases, heat networks are built before the eventual customer has any interest in the property. As such, the customer has no ability to influence the technical design or commercial arrangements of the heat network. In this section, we summarise the process by which heat networks for new build properties are procured and built, the incentives on property developers in the construction of these heat networks and the subsequent impact on customers.
- 4.2 Heat networks can supply customers in new build properties or existing buildings. All new build properties and most building work on existing buildings must meet Building Regulations, which are minimum standards for design, construction and alterations to virtually every building.⁷⁴ Building Regulations cover a wide range of issues, one of which is energy performance.⁷⁵ Some local authorities set energy and carbon requirements beyond these minimum standards as set out in their local/development plan.
- 4.3 In some locations heat networks can be the most cost-effective way of achieving carbon targets set out in planning regulations. In some areas, such as London and Scotland, the requirement to consider building, connecting to or ‘future proofing’ for connection to a heat network is explicit.
- 4.4 We have been told by property developers, however, that the infrastructure costs associated with installing a heat network – particularly a district heat network – are likely to be higher than the cost of installing alternative heat and hot water solutions, such as individual gas boilers.
- 4.5 In common with all heating and hot water infrastructure, heat networks represent a ‘one-off’ capital expenditure and developers will seek to recover most, if not all,⁷⁶ of this expenditure through the sale of its properties.

⁷⁴ The [Building Regulations 2010](#).

⁷⁵ Building regulations are devolved and, as set out in Appendix D there are separate regulations, approved documents and compliance guides in each country in the UK.

⁷⁶ See paragraphs 5.33 to 5.44 in section 5 (monopoly supply).

Selection and performance of heat networks supplying new build properties

- 4.6 There are two circumstances in which misaligned incentives can lead to inappropriate choice and design of heat networks, with a failure to consider the whole life costs of networks:
- (a) Where the heat network was not the most cost-effective system to provide heating and hot water solutions, but the most cost-effective way to meet planning requirements.
 - (b) Where property developers try to minimise the upfront costs of installing a heat network, resulting in higher ongoing costs for the operation and maintenance of the network, which fall on customers.

The availability of a cheaper alternative heat supply

- 4.7 As set out in section 2 and Appendix D, the planning regime can be a key driver of the development of new heat networks in some parts of the country where the local/development plan sets requirements over and above Building Regulations. Whilst this affects only a subset of the new heat networks being built, it can result in a failure to take heat network customer interests into account when a developer chooses a heating and hot water solution.
- 4.8 Where planning permission is required,⁷⁷ a public or private sector developer will apply to the local planning authority for permission to develop a site. This application must demonstrate that the development will comply with the requirements set out in the local plan.
- 4.9 This could lead to a situation in which a heat network is the most cost-effective way of meeting these requirements but may be more expensive to install and operate than an alternative form of heat supply. This leads to a risk that whilst the benefits of the heat network, such as carbon savings, accrue to society as a whole, the additional costs will be borne by the customers of heat networks through higher property prices or heating bills.
- 4.10 The planning system in London provides an example of consideration of end user price at the planning permission stage. The London Plan includes an explicit requirement to consider heat networks for major developments⁷⁸ and the London Heat Network Manual indicates that this should be at a

⁷⁷ Some development is defined as 'permitted development' and does not require planning permission.

⁷⁸ [Decentralised energy in development proposals](#), London Plan, Policy 5.6.

competitive price.⁷⁹ However, in transposing this into local plans, London boroughs only need to ‘generally conform’ with these requirements.

- 4.11 We have found that customers are not engaged at this stage of the process and that there is a lack of transparency in the sector (see section 6 below). We are concerned that there are insufficient safeguards currently in place to protect customer interests at the planning stage.

The incentive to minimise upfront costs

- 4.12 Once the decision has been made to build a new heat network, property developers will usually take responsibility for the design and build of the network as part of the overall construction of its development (especially for multiple occupancy single buildings). In this scenario, developers will typically run a commercial tendering process to sub-contract installation of the building services. As described in section 2, these communal heating or smaller district heating schemes are then commonly managed by the property owner or manager as part of overall building services provision.
- 4.13 Alternatively, developers may choose to appoint an energy specialist (ie an ESCO). An ESCO could adopt and operate an asset that has already been built or could be involved at this early stage of design and build and possibly also contribute funding to the initial investment. The latter is more common for larger developments utilising a district heating scheme or for very large communal heating schemes. The ESCO will take responsibility for provision of services, such as the long-term operation, maintenance, metering and billing activities associated with the network. This model may also include some subcontracting.
- 4.14 In our statement of scope and update paper, we raised the potential concern that a property developer could have the incentive to design and build a network which has cheaper up-front costs at the expense of higher long-run operation and maintenance costs (based on the premise that if construction costs are reduced and the sale value of the property remains the same, this would increase developers’ profit margins as ongoing costs will be borne by customers instead). For example, developers may choose not to install key components in order to reduce capital expenditure, without regard to how the network as a whole will operate in the longer term. This can reduce the operational efficiency of the network and therefore the quality of the service

⁷⁹ [London Heat Network Manual](#), pages 16 and 100.

received by customers, as well as the price they ultimately pay for their heating and hot water supply.

- 4.15 The lack of measurable and enforceable standards for the design, build, commissioning and operation of heat networks means that customers are afforded little guaranteed protection and means that there is a significant risk to customers from misaligned incentives between property developers, heat network operators and customers.
- 4.16 Some stakeholders told us that the lack of standards and expertise in this market can lead to property developers demanding inappropriate requirements when specifying the network. These requirements can increase the upfront and ongoing costs of operating networks. We were told that design engineers may not challenge this due to concerns regarding their professional indemnity insurance. The technical standards of heat networks are discussed in greater detail in Appendix E.
- 4.17 Property developers told us that reputational concerns may, in some instances, mitigate the risk of minimising up-front costs at the expense of operational performance and future costs, particularly when properties on a large development site are released for sale in phases. Property developers that hold long-term interests in their developments, as is often the case for local authorities or housing associations, may be more likely to consider the long-term implications for customers at the design and build stage.⁸⁰ However, the lack of customer engagement or control at this stage of the decision-making process,⁸¹ as well as the lack of enforceable standards associated with the design, build and operation of the network affords customers little guaranteed protection.

Findings

- 4.18 We found that there is a risk that:
- (a) Planning requirements which drive the construction-of or connection-to a heat network, can lead to heat network customers facing higher prices than if alternative heat and hot water solutions were installed.

⁸⁰ ESCOs also noted that given their role in the long-term operation of the network, they will try to maximise operational efficiencies and minimise long term costs where they are able to influence design and build. However, as is noted within the monopoly supply section of this report, ESCOs often set price based on the cost of an alternative heating system and therefore any benefits or savings won't necessarily be passed on to customers.

⁸¹ See, for example, the [Kantar Public qualitative research](#).

(b) The lack of enforceable technical standards with respect to the infrastructure of the network can compromise the operational efficiency of the network and increase costs for heat network customers.

4.19 We therefore consider that mechanisms should be introduced which ensure greater consideration is given to the prices that will be charged to the customers of a heat network at the planning consent stage. In addition, a mechanism to enforce technical standards should be introduced which ensures that the networks are built, and operated, to a sufficiently high technical standard. Our recommendations are discussed in greater detail in section 7.

5. Monopoly supply and delivery models

- 5.1 In our statement of scope and update paper, we highlighted that the substantial, upfront fixed costs of heat networks may lend them some of the characteristics of natural monopolies, in that it may not be economically efficient for there to be more than one heat network in a given area.
- 5.2 As such, for many heat network customers, the only practical substitute to being supplied by a heat network is the use of electric heating, which is an expensive alternative. In addition, some heat networks require that customers pay standing charges whether or not they use the heat (ie they are effectively unable to disconnect and terminate their contract).⁸² Together, these factors significantly restrict the ability of customers to switch away from their heat network, creating monopoly power for developers and freeholders.
- 5.3 In this section, we have analysed how this monopoly power is being reflected in the market in practice. To provide context, we have reviewed the costs of heat networks. Our analysis indicates that, for many heat networks, the ongoing costs associated with operating the network are lower than the comparable ongoing costs of serving customers with individual gas boilers. This finding is consistent with the views gathered from operators of heat networks during our engagement with stakeholders.
- 5.4 However, the ability of customers to benefit in terms of lower prices from these lower costs and the extent to which this monopoly supply leads to consumer detriment may largely depend on the choice of delivery model and the rights and protections afforded to customers (whether expressed or implied legally) within their leasehold, tenancy or heat supply agreements. In part, this may reflect how the upfront cost of building a heat network is recovered.
- 5.5 The costs of heat networks may also vary for a number of operational reasons, including the benefits of economies of scale, the design of the network, and the way in which heat is generated. To inform our assessment of the risks associated with monopoly supply, and what recommendations might be effective in addressing those risks, we have analysed the costs and profitability of some heat networks below.

⁸² Responses to the CMA's supplier questionnaire showed that customers on 88% of heat networks did not have the option of disconnecting.

Financial analysis

- 5.6 We have analysed the operating costs (OPEX) and capital expenditure (CAPEX) for a selection of heat networks which provided data to us. We have also analysed the profitability of a sample of companies involved in the heat network supply chain which had published standalone audited annual accounts for their heat network activities.
- 5.7 Our analysis includes only a small proportion of the industry and is therefore only illustrative of the wider market. However, the analysis is useful to understand in the context of stakeholder submissions on the financial performance of heat network operators, and the potential effects of our recommendations.

The costs of operating heat networks

- 5.8 We have analysed the operating costs for five district and four communal scale heat networks. These costs include the day-to-day costs to operate the heat network such as fuel (gas/biomass) purchases, maintenance and overheads.⁸³
- 5.9 In Figure 3 below, we have compared the annual OPEX per customer of these nine heat networks. We have illustrated how these costs compare to those incurred by retail suppliers of gas⁸⁴ and providers of gas boilers⁸⁵ (the gas boiler benchmark). We used two methodologies to calculate this benchmark cost. These include adding the OPEX incurred by providers of boilers, and:
- (a) the average operating costs per customer for the six large energy suppliers in the UK.⁸⁶ This average includes households that are larger than those supplied by heat networks, and thus have higher consumption of gas. Therefore, we refer to this benchmark cost, as the upper bound; and
 - (b) the average operating costs per customer of domestic gas suppliers in the UK, adjusted for efficiency and consumption levels similar to those on

⁸³ The nine heat networks submitted up to three years of specified financial information, following a formal request by the CMA.

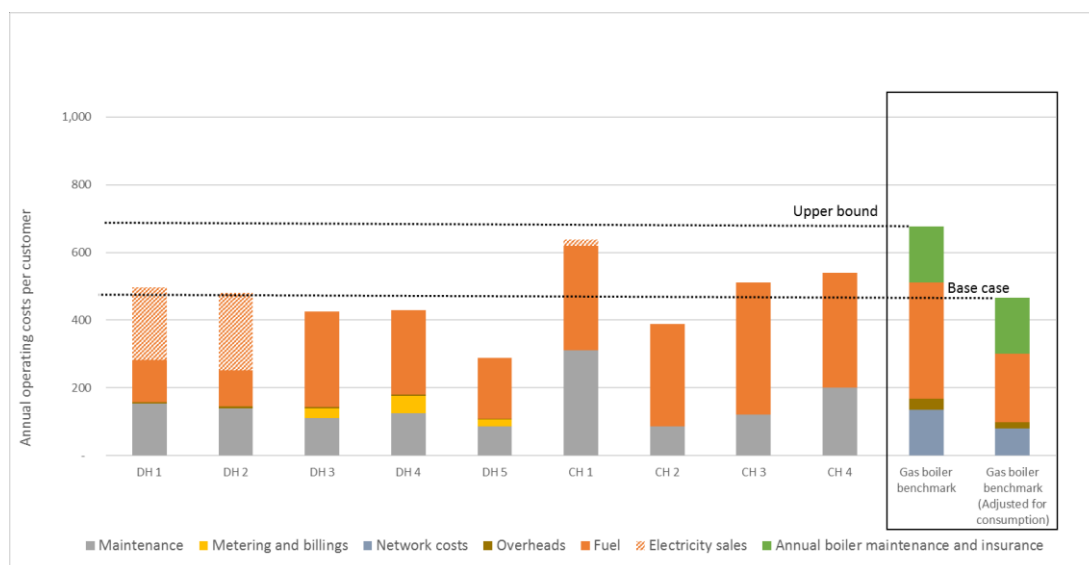
⁸⁴ The key costs incurred by retail suppliers of gas include fuel purchases, network charges (maintenance) and billing (see Figure 3).

⁸⁵ This relates to the OPEX incurred by the providers of gas boilers, not the price paid by end consumers. We calculated this by adding the maintenance and insurance costs charged to final consumers (revenue for providers) and then stripping out a profit margin from this revenue, to arrive the OPEX.

⁸⁶ [CMA Energy Market Investigation, Profitability of retail energy supply: profit margin analysis](#), page 37.

heat networks. Therefore, we refer to this benchmark cost as the 'base case'.⁸⁷

Figure 3: Annualised operating costs of heat network compared to a gas boiler benchmark



Source for heat network: Three years of financial data obtained from five district and four communal heat networks.

Source for gas boiler benchmark: [CMA energy market investigation](#) and CMA analysis in the heat network market study.

Note 1: DH refers to district heating and CH refers to communal heating.

Note 2: DH1 and DH2 use a CHP boiler. The shaded orange bar relates to revenue from electricity sales. The net cost per heat network customer is the solid bar, ie the heat network cost less the part of that cost funded by electricity sales.

- 5.10 Figure 3 shows that total OPEX varies significantly across these nine heat networks ranging from £300 to £650 per customer. This is consistent with stakeholder submissions that heat network costs vary widely for a number of reasons such as scale, efficiency of the energy centre, quality of service and technical abilities of the heat network operator.
- 5.11 If we calculate the net OPEX after the electricity sales for the two district heat networks with CHP boilers (DH1 and DH2 in Figure 3 above), then the annual average OPEX for these two networks reduces significantly from £500 to £270 per customer. This shows that electricity sales significantly reduce the cost of operating district heat networks using CHP boilers.
- 5.12 On a like-for-like basis, the average annual cost per customer for heat networks is lower than that for the base case of the gas boiler benchmark (£470). In our small sample, this pattern of lower costs for heat networks was driven by the costs per customer of the district heat networks, which were

⁸⁷ These 'upper bound' and 'base case' benchmark costs, which differ due to the assumptions on consumption, are not calculated in a way that makes them directly comparable to the approach taken to the calculation of the two comparator gas tariffs ('Comparator 1' and 'Comparator 2') in section 3, above.

consistently lower (after CHP sales) than both the communal heat networks and the gas boiler benchmark. As noted above, this finding is consistent with views gathered from heat network operators.

- 5.13 The cost of heat networks is driven by fuel costs which range in our sample from 55% to 70% of total operating costs, making it the largest operating cost.⁸⁸ Fuel costs per customer for heat networks do not vary significantly in scale from the gas boiler benchmarks. Maintenance costs range from 25% to 35% of total operating costs. Total overheads including items such as metering and billing, salaries, rates, and insurance range from 5% to 10% of total operating costs.

Whole life costs of heat networks

- 5.14 We have examined the whole life costs (WLCs) of the same five district heat networks.⁸⁹ The WLCs comprise the operating costs presented above and also the capital expenditure to construct the heat network infrastructure (see paragraph 2.27).
- 5.15 Figure 4 builds on Figure 3 by adding the annualised CAPEX cost for the five district heat networks we examined and adding the upfront cost of a gas boiler.⁹⁰ Hence, Figure 4 compares the WLC (including capital cost) of the same five district networks to the WLC incurred by providers of gas and boilers (the gas boiler WLC benchmark). The gas boiler WLC benchmark does not include any upfront connection cost for connecting to the gas distribution network.⁹¹

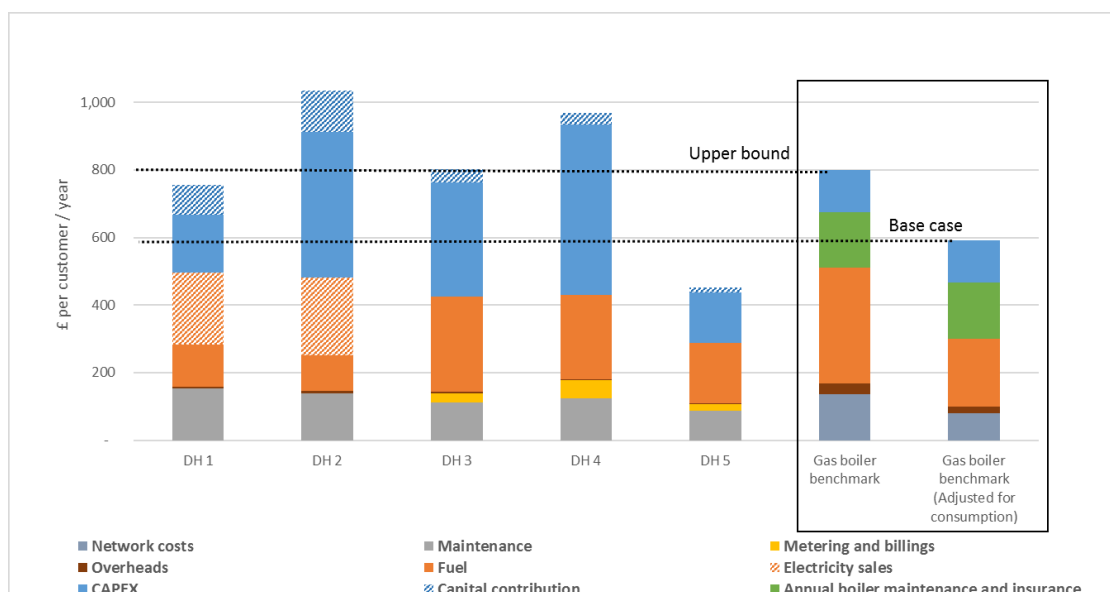
⁸⁸ This includes the actual costs of fuel purchases, and does not net-off electricity sales against fuel costs for those heat networks operating CHP plants.

⁸⁹ The five heat networks submitted up to three years of specified financial information. We could not do this analysis for communal heat networks due to the lack of data.

⁹⁰ The estimated useful economic life for these five district heat networks range from 20 to 25 years, and averaged 23 years.

⁹¹ The cost of connecting to the gas distribution network would depend on the cost of any new assets required. The process is summarised on [Ofgem's website](#).

Figure 4: Annual whole life costs of district heat network compared to the gas boiler WLC benchmark



Source for heat network: Three years of financial data obtained from five district heat networks.

Source for gas boiler: [CMA energy market investigation](#) and CMA analysis in the heat network market study.

Note 1: The capital contribution is amount paid by ESCOs as contributions towards the heat network in return of access rights (see paragraph 5.34).

5.16 Figure 4 indicates that the WLC of district heat networks are mostly higher than the cost of a gas boiler and ongoing costs of gas. Figure 4 also shows that CAPEX costs vary significantly across district heat networks from £170 to £550. This further illustrates that the costs of installing and operating heat networks can be expected to vary widely across different networks, consistent with our analysis of heat network bills in section 3.

5.17 The WLC analysis also indicates that if district heat network prices are linked to a benchmark based on a gas price comparator, then the prices paid by district heat consumers would still be lower, on average, than the WLCs of these networks. We have taken this into consideration in developing our approach to recommendations in section 7.

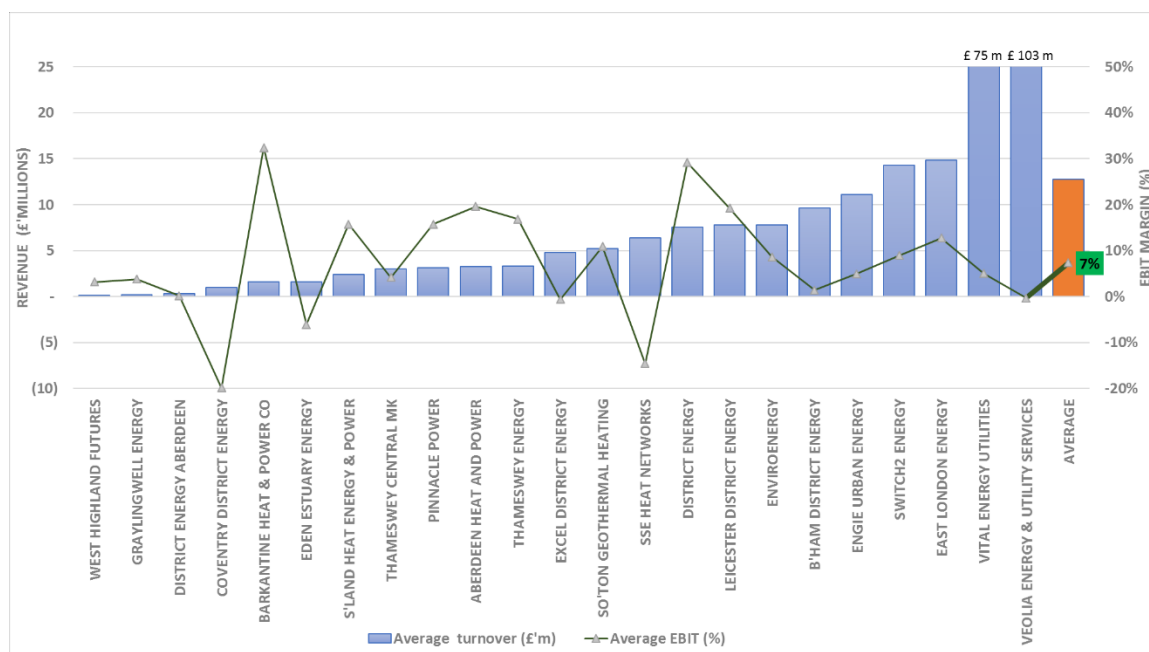
Profitability of heat networks

5.18 In Figure 5, we have assessed the profitability of 23 companies that are primarily involved in the heat networks supply chain.⁹² These include companies supplying domestic and non-domestic customers in the UK. We have used the earnings before interest and tax (EBIT) margin as the

⁹² We identified 23 companies whose primary activity related to heat networks and who filed unabridged accounts with Companies House.

profitability measure.⁹³ The revenue and EBIT numbers in Figure 5 relate to the average of last two years of financial data for each of the companies.

Figure 5: Revenue and EBIT margins for 23 companies involved in heat networks



Source: Audited financial statements from [Companies House](#).

5.19 Figure 5 shows that the levels of profitability for these companies are neither excessively high nor too low, and that most, but not all, companies have been profitable. The average EBIT margin generated by these companies is 7% although there is a wide range from negative 20% to positive 30%.

5.20 The finding in Figure 5 that profitability of heat networks varies is consistent with our findings in Figures 3 and 4, which show that costs vary by network, and our findings in section 3 in respect of the prices of heat networks.

Heat network delivery models

5.21 As described in section 2, there is no uniform 'off the shelf' delivery model or commercial structure used to deliver and operate a heat network. Private freeholders can select one of many business models to deliver and operate a heat network on behalf of end customers. However, in considering the consequence of monopoly supply for customers, we have considered the business models within two broad categories based on who holds the right to use the networks; the leaseholder or an ESCO. Respondents to our consultation on the update paper confirmed that these are main categories of delivery model.

⁹³ The EBIT margin is a return on revenue measure (in percentage terms) that equals EBIT divided by revenue.

- 5.22 In this section on delivery models, we focus on privately-operated heat networks. We do not focus on heat networks operated by local authorities in this section as we consider that the risk of detriment is substantially reduced as they do not have the same profit motive and incentives as private operators. In addition, our pricing analysis suggests that prices are lowest within the local authority segment of the market.

Right to use sits with leaseholders, possibly via standard lease agreements

- 5.23 In most cases, once the network is built, the 'right to use' the network is passed from the freeholder to the leaseholder and the responsibility for managing the heat networks falls on landlords or a property management company.
- 5.24 Given that the operation of a heat network does not typically form part of the landlord or property management company's core skillset, certain services within the supply chain are likely to be outsourced to specialist network operators or specialised metering and billing companies. These contracts are likely to be reviewed on a regular basis and will be assessed against a set of cost and performance criteria. The companies responsible for these outsourced services will charge the landlord or property management company directly and, in turn, these charges are likely to be recovered from final customers through management service charges.⁹⁴
- 5.25 In most cases, property management companies are paid a fixed fee for managing a property (as opposed to deriving income from a mark-up on costs incurred on behalf of the property). As a result, management service charges will be based on the level of costs actually incurred and there should be no incentive for the property manager to inflate these charges as their remuneration is not based on the amount they charge for heating (or indeed any other service).
- 5.26 We are aware that, in some cases, annual property management service charges are calculated as a percentage of costs incurred by residents for their communal services. However, this approach is considered to be poor practice by the Association of Residential Managing Agents and by the Royal Institute of Chartered Surveyors⁹⁵ and, importantly, even in these circumstances, residents will continue to have the opportunity to review and challenge these

⁹⁴ There is variation in how these costs are recharged to residents. They may form part of a separate energy service charge, possibly managed by an energy management company owned by the residents. Alternatively, it may constitute a separate line item within the main service charge.

⁹⁵ [LAN 13: Management fees](#), ARMA, 24 September 2012.

costs in the same manner they could assess the cost of other communal services.

5.27 In circumstances in which the network is managed by landlords, landlords will only be able to recover costs that are reasonably incurred. The Leasehold Advisory Service (LEASE) advises that landlords should only be reimbursed for costs incurred and should not be given the opportunity profit from their management of the building.⁹⁶ This would appear to be consistent with Section 18(1) of the Landlord and Tenant Act 1985 which defines a service charge as ‘an amount payable by a tenant of a dwelling as part of or in addition to the rent:

- (a) which is payable, directly or indirectly, for services, repairs, maintenance, improvements or insurance or the landlord’s costs of management; and
- (b) the whole or part of which varies or may vary according to the relevant costs.’

5.28 As a result, whilst there may be some, cases where property managers may have the ability and incentive to charge unduly high prices, the available evidence suggests this is unlikely to be a widespread concern. Consequently, customers appear to have a reasonable level of protection against exploitative conduct from the owners and operators of the network.

5.29 As such, although customers may also contribute to a sinking fund to replace depreciated assets, under this leaseholder model, property developers are expected to recover the capital expenditure of building the network, or connecting to an existing network, through the purchase price of the property, as with other infrastructure associated with the property.

5.30 We also note that, in this delivery model, the operating and maintenance contracts are typically for four years or less and can therefore be periodically retendered.

Right to use sits with the ESCOs, via concession agreements

5.31 An alternative delivery model that developers may engage in for district and large communal heat networks involves long-term concession type arrangements being established with an ESCO. Under this model, the ‘right to use’ the network will be leased out by the freeholder to the ESCO, which then has the right to access and operate the network. These agreements, which tend to last at least 20 years, also pass responsibility for the replacement of

⁹⁶ [Service charges and other issues](#), LEASE.

assets to the ESCO, who bill and collect heat charges directly from customers and retain all of the revenues (as opposed to alternative subcontracting models where the network operator collects the revenues and passes them onto the client).

- 5.32 Although we have focused on concession models in the private sector, we are conscious that, although less common, concession models (and ‘capital contributions’ from ESCOs to property developers discussed in this section) could also be used in a network initiated in the public sector by a local authority or housing association.
- 5.33 In the concession model, contracts are likely to be tendered on a commercial basis by freeholders. Typically, ESCOs set out how they will set prices to customers as part of the tendering process. Once appointed by a developer ESCOs do not typically have the freedom to set prices unconstrained. For example, ESCO contracts may require the ESCO to set ongoing prices by reference to an alternative fuel, and standing charges based on a starting point, adjusted for a suitable measure of cost inflation.
- 5.34 However, the full criteria used to assess the tenders submitted by ESCOs are currently determined by the freeholder and there is nothing to ensure that the prices the ESCOs propose to charge heat network customers, including their reasonableness, are appropriately considered. Indeed, freeholders may request a fee, often referred to as a ‘capital contribution’ from the ESCO, or the ESCO may fund part of the design and installation of the network directly, in return for gaining exclusive rights to the heat network.
- 5.35 In a situation with no capital contribution, the property developer incurs all costs to build the heat network and recovers this expenditure through the sale of properties. In contrast, where there is a capital contribution, the property developer recovers the remaining costs of building the heat network that have not been reimbursed by the ESCO through the property sale value and the ESCO recovers their capital contribution through ongoing standing charges to heat network customers.
- 5.36 In circumstances where ESCOs offer capital contributions to a property developer, the developer may face incentives to select an ESCO on the basis of the size of this contribution, rather than the price and quality that the ESCO is prepared to offer to heat network customers.
- 5.37 We understand that ESCOs calculate the level of contribution they are prepared to offer by developing a forecast discounted cash flow model to estimate future income and costs over the length of the concession agreement. As such, the higher the prices they propose to charge within their

tender offer, the higher the capital contribution they can afford to offer to the developer.

- 5.38 This may, in turn, create incentives for ESCOs to propose prices in their tender submissions above the forward-looking costs, including their required rate of return, faced when supplying customers. Indeed, in order to maximise the ‘capital contribution’ they are able to offer (and thereby increase the likelihood of being appointed by the property developer), ESCOs may face incentives to propose prices at the highest level that they consider the developer would consider acceptable, even where this bears little relation to the underlying costs.
- 5.39 It is therefore possible that the combined incentives of: (a) property developers appointing an ESCO based on the level of capital contribution; and (b) ESCOs proposing high prices in order to maximise the capital contribution they can offer the developer and therefore their likelihood of being appointed, could result in prices charged to customers being considerably above the level we would expect if developers sought to minimise the price that heat network customers will pay.
- 5.40 However, we were told by both ESCOs and freeholders that, in practice, there already is an effective price cap in the market which ensures that customer tariffs do not exceed the individual household gas boiler price.⁹⁷ Property developers we spoke to said that a situation in which customers are paying heat prices which are higher than a reasonable benchmark could harm their reputation (especially on multi-phase builds, where negative experiences of customers in early phases could affect their ability to sell dwellings in the later phases of the build).
- 5.41 We note, however, that this effective price cap does not ensure that customers are receiving the best available tariffs or that their prices reflect cost. This means that, on average, customers are likely to face higher prices in a scenario where ESCOs commit to set prices by reference to a benchmark price based on individual gas boilers, than in a scenario in which proposals put forward by ESCOs in the tender were considered only on the basis of quality of service, with customers’ tariffs linked to ESCOs’ network operating costs. As discussed in our financial analysis presented in Figure 3 above, for most heat networks, the ongoing cost per customer of operating the network is less than the comparable cost incurred in connecting customers to the gas network with an individual boiler.

⁹⁷ We note that this price is not well-defined and indeed, can be referenced against Standard Variable Tariffs which are currently much higher than the cheapest available tariffs in the gas and electricity markets.

- 5.42 At the same time, we have been told – and our analysis supports – that the value of the capital contribution paid by ESCOs to freeholders is often significantly less than the capital expenditure incurred by the developer. As such, even when a payment has been made by the ESCO to the developer, this does not mean that total payments made by customers are likely to exceed the whole life cost of the network. In other words, whilst there may be some contribution from an ESCO to the developer, the majority of the upfront cost is generally still met by the developer.
- 5.43 Our discussions with property developers have indicated that concerns about the potentially damaging effect that high prices for heat network customers can have on their reputation has led to many no longer requesting a capital contribution from the ESCOs for the rights to use the network, as this leads to an upward pressure on the end prices that ESCOs are able to offer as part of the tendering process.
- 5.44 This market development was confirmed in our discussions with ESCOs, which told us that whilst the practice of requesting these contributions was previously widespread, developers are now more likely to tender out these contracts on the basis of quality and prices for customers only. Nonetheless, at present, we note that there is nothing to prevent developers from agreeing contracts that lead to higher prices for consumers.

Findings

- 5.45 We consider that where the ‘right to use’ the network is transferred to customers as part of their leaseholder or tenancy agreements, this addresses the issue of the freeholder’s monopoly power.
- 5.46 Although property management companies may not be specialists in the operation and maintenance of heat networks, we note that they typically operate a ‘cost recovery model’ in which there is no profit element. As such, property managers are generally not incentivised to inflate costs. Leaseholders typically receive a breakdown of service charge costs and are able to challenge costs (with any significant new expenditure requiring consultation with leaseholders).⁹⁸ In addition, leaseholders may have the ability to remove their property management company if they are not satisfied with their services, although we note that there are challenges to doing so.⁹⁹

⁹⁸ See, for example, [The Service Charges \(Consultation Requirements\) \(England\) Regulations 2003](#).

⁹⁹ This is highlighted in MHCLG’s April 2018 [response](#) to its consultation on protecting consumers in the letting and managing agent market.

5.47 We also note that:

- (a) the operating and maintenance contracts are typically for four years or less and can therefore be periodically retendered – unlike the long-term concessions observed under the ESCO model; and
- (b) there is no directly comparable mechanism to that of ‘capital contributions’ under which customers would pay more for their heat than the ongoing cost of operating and maintaining the networks.

5.48 As such, customer interests should be protected in the same way their interests are protected with respect to all communal assets in multi-occupancy residencies. Therefore, remedial action to improve outcomes for these customers should be focused on transparency and helping them determine whether they are receiving a good service. This is considered further in section 6.

5.49 Where the ‘right to use’ the network has effectively been transferred to an ESCO, end customer interests are only protected to the extent that their interests were considered by the freeholder as part of the negotiation or tendering process and are reflected in the ESCO’s terms of service. As noted above, if tenders were assessed on factors other than service quality and tariffs for customers, such as where the commercial arrangements between these parties involved a payment from the ESCO to the developer then, all else being equal, customers are likely to be worse off than under the first model.

5.50 We set out recommendations to address this concern in section 7.

6. Transparency

Introduction

- 6.1 Consumers need to be able to access, assess and act upon relevant information on heating options in order to take informed decisions and provide an effective constraint on suppliers. As noted in our statement of scope and update paper, transparency is a prerequisite for this, and we suggested that it would be important to assess the extent of transparency in relation to heat networks. This is important at every stage from searching for a property (to buy or rent) to during residency. The importance of transparency was also emphasised in responses to our consultation on the update paper.
- 6.2 In this section, we consider transparency both prior to moving into a property and during residence and set out our findings.

Pre-transaction transparency

- 6.3 To develop an understanding of the degree of pre-transaction transparency provided to consumers, we considered the following:
- (a) Qualitative consumer research conducted by Kantar Public.
 - (b) Customer complaints and submissions received by the CMA.
 - (c) Pre-transaction documents from suppliers and property managing agents.
 - (d) Reports produced by consumer groups.

Kantar Public research¹⁰⁰

- 6.4 Research commissioned by the CMA and delivered by Kantar Public traced the home move journey for participants through key stages: searching for a property; viewing a property; preparing to move in; moving in; and experience since moving in. We describe the key findings below.¹⁰¹

¹⁰⁰ Kantar Public, [Qualitative Research: Heat Networks](#).

¹⁰¹ We note that here are a number of limitations to the Kantar Public research findings, relating to final sample composition, including: (a) the research included consumers that had moved more than three years ago, limiting their recall of the exact information received during the home move journey; (b) the sample did not include an even spread of tenure, mainly consisting of owner occupiers and housing association tenants. Only one local authority tenant and two private renters were recruited, meaning that findings for these tenures are indicative rather than conclusive; and (c) out of 11 owner occupiers, four had previously complained to the CMA, which might explain why experiences of owner occupiers in our sample are more negative than those of other groups of respondents. However, the findings of Kantar Public research – particularly those relating to pre-transaction transparency – are broadly in line with other evidence we have considered.

Searching for property

- 6.5 Heating was of low importance compared with other priorities during property search. During the search for a property, participants' priorities were location, budget and other property features with respondents not noticing or seeking out information about heating. In addition, the choice of property was limited for all (regardless of tenure) as most of these participants were located in London where the respondents viewed the housing market as particularly competitive.¹⁰²

Viewing a property

- 6.6 Respondents reported that heating was not always described during viewings and when mentioned it was most often labelled as 'green' or 'energy efficient'. This was particularly the case for owner occupiers. Engagement with this information was low when deciding on a property. This was partly due to participants not fully understanding that the heating was different from conventional heating.¹⁰³
- 6.7 In the case of local authority and housing association tenants, if heating was mentioned, it was often referenced in relation to service charges for utilities as part of the tenancy agreement.¹⁰⁴

Prior to moving in

- 6.8 Owner occupiers appeared to receive the most information about heating prior to moving in, relative to other tenures. However, 'information overload' was experienced due to the amount of overall information received and paperwork involved in purchasing a property. If heat network information was provided, minimal attention was paid to it due to preoccupation with other significant issues such as securing a mortgage.
- 6.9 Owner occupiers recalled receiving an EPC. However, heating costs and tariffs were not generally discussed with estate agents nor sales staff prior to moving in.¹⁰⁵

¹⁰² Page 11, Kantar Public, [Qualitative Research: Heat Networks](#).

¹⁰³ Page 12, Kantar Public, [Qualitative Research: Heat Networks](#).

¹⁰⁴ Page 13, Kantar Public, [Qualitative Research: Heat Networks](#).

¹⁰⁵ Page 14, Kantar Public, [Qualitative Research: Heat Networks](#).

Upon moving in

- 6.10 Participants started to engage with their utilities and began to understand that there is a difference between heat networks and conventional heating at this point in the home move journey. However, due to the technical nature of the information provided, understanding of the consequences of being supplied by a heat network were not appreciated and engagement was low.
- 6.11 For owner occupiers who were told that their heating is green or efficient, the move in stage was often the point at which they realised that they were on a heat network. Generally, this realisation came after reading home user manuals or a welcome pack from their supplier.
- 6.12 Most owner occupiers and private renters were not aware of who their heat supplier was until moving in or shortly after (when they were setting up an account). Few had received a contract from their supplier or were asked to sign a contract at any point.^{106,107}
- 6.13 The private renters who took part in the research¹⁰⁸ were much less engaged than owner occupiers and said that they did not read home user manuals, even if they did receive them. The private renters spoken to were unaware even at the point of research that their property was part of a heat network.¹⁰⁹
- 6.14 Local authority and housing association tenants received little information about their heat network at the point of moving in. Most commonly they received information about heating costs as detailed in the tenancy agreement.¹¹⁰

Which?

- 6.15 Research undertaken by Which? suggested that information about heat networks received by some consumers before they purchased a property was poor or misleading. Almost all participants surveyed by Which? said the property had been marketed as having 'low cost' heating, but did not feel this was the case once they had received a bill.

¹⁰⁶ Two owner occupiers were given unsigned contracts when they later asked for a copy of their contract from their supplier.

¹⁰⁷ Page 16, Kantar Public, [Qualitative Research: Heat Networks](#).

¹⁰⁸ Note that there were only two private renters in the sample so these findings should be treated as indicative only.

¹⁰⁹ Page 17, Kantar Public, [Qualitative Research: Heat Networks](#).

¹¹⁰ Page 17, Kantar Public, [Qualitative Research: Heat Networks](#).

- 6.16 For others, the issue was not about the quality of the information, but about the lack of choice. For example, a consumer buying a property on a new network in London said that they had had misgivings about signing the heat supply agreement because of the terms. However, they felt they had no choice but to go ahead with the purchase, as they had already invested significant time and money in buying the flat.¹¹¹

CMA analysis of pre-transaction documents received

- 6.17 A significant proportion of suppliers and managing agents told us that they do not provide pre-transaction documents, either to prospective tenants (private renters or local authority and housing association tenants) or to prospective purchasers.¹¹²
- 6.18 A small number of sample pre-transaction documents were submitted to us by heat suppliers and property managing agents including representative heat supply agreements or equivalent contract, a bill and an EPC. Our emerging findings, based on these documents, are that consumers generally receive very limited information about the type of heating in a property prior to moving in: this may even be limited to an EPC stating that heating and hot water are supplied to the property by 'a community scheme'. We have not seen evidence of an explanation of 'community scheme' in the EPCs we have reviewed.
- 6.19 A number of stakeholders have told us that the fuel cost estimates for properties with a heat network may not provide a realistic estimate of the likely cost of heating their home for potential residents. We are exploring why this may be the case. We note that the Scottish Government and MHCLG are considering the potential to make improvements to EPCs and will continue to engage in this area.
- 6.20 A small number of heat suppliers submitted sample documents providing a reasonable standard of information to consumers, for example an explanation of how the heat network operates, detailed information about payment and instructions on who to contact in an emergency. In addition, one supplier provides consumers with suggestions on how to save energy in their property. However, and as an example of possible best practice, one supplier also provides consumers with information on their complaints process (with a timetable for the resolution of complaints), an explanation of each aspect of

¹¹¹ [Turning up the heat: getting a fair deal for district heating users](#). Which? March 2015, page 13.

¹¹² Where an existing leaseholder is selling a property, the usual practice, according to those suppliers and managing agents we spoke to, is for the leaseholder to provide pre-transaction documents to a prospective purchaser.

their bill, advice on what to do if they are unable to pay, and the special arrangements available to assist vulnerable consumers.

CMA analysis of customer complaints and submissions received by the CMA

- 6.21 About one third of complaints the CMA assessed mentioned pre-transaction transparency concerns. These included complaints that consumers felt they had been mis-sold the heat network, feeling that inaccurate or misleading information had been provided to them prior to transaction.

Findings on pre-transaction transparency

- 6.22 In summary, we find that consumer engagement and awareness of heating is low prior to property transactions. Even where there is consumer awareness, it tends to be of little significance in consumers' decision making.
- 6.23 Consumers generally start to consider utilities and begin to understand that there is a difference between heat networks and conventional heating at the point of moving into a property. Matters such as contract duration, exclusivity and relative pricing of heat networks compared with other energy options may therefore not be considered until after consumers have made their decision to move into a property.
- 6.24 We found that a significant proportion of suppliers and managing agents do not provide pre-transaction documents. Even where documents are provided, many contain limited information about the type of heating in a property prior to moving in.
- 6.25 These findings suggest that consumers are not sufficiently informed regarding the characteristics and ongoing costs of heat networks when making their decision on whether to move into a property with a heat network. In turn, this may restrict the ability of consumers to make informed decisions and challenge heat network providers regarding the price and quality of their networks.

During residency

- 6.26 To understand the degree of information provided to consumers during residency, we considered the following:
- (a) Complaints received by the CMA.
 - (b) Bills received from suppliers.
 - (c) BEIS heat networks consumer survey.

(d) Kantar Public consumer research.

(e) Reports produced by consumer groups.

6.27 We reviewed this information in relation to a number of key areas relevant to consumers' experience during residency, including:

(a) General awareness of heat networks/service arrangements.

(b) Frequency and clarity of bills.

(c) Calculation of bills.

(d) Heat supply contracts.

Awareness of the heat network/service arrangements

Kantar Public research

6.28 Kantar Public's research indicated that understanding of heat networks depended on participants' experiences and degree of satisfaction. Those who had negative experiences became more engaged with their heat network suppliers and were more motivated to seek out further information. On the other hand, those with positive experiences had little reason to attempt to engage with suppliers, and tended to have lower engagement with and understanding of their heat network.

6.29 As a result of this engagement and information received, participants realised that a heat network was different to conventional heating. Specifically, participants became aware that even if they were unhappy with the heating supply, billing, heating costs or customer service, they could not switch supplier and there was no body to which disputes with their supplier could be escalated.¹¹³

BEIS Survey

6.30 The BEIS heat networks consumer survey¹¹⁴ suggested that heat network customers were somewhat less likely than non-heat network customers to have received information on: the type of heating system they had;¹¹⁵ maintenance and service arrangements;¹¹⁶ and how to change the

¹¹³ Page 21, Kantar Public, [Qualitative Research: Heat Networks](#).

¹¹⁴ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 42, page 60.

¹¹⁵ 41% for heat networks compared to 47% for non-heat networks.

¹¹⁶ 28% percent for heat networks compared to 32% for non-heat networks.

temperature.¹¹⁷ However, heat network customers were more likely than non-heat network customers to have received information on how they would be billed for heating¹¹⁸ and the likely cost of heating.¹¹⁹

Frequency and clarity of bills

CMA analysis of customer complaints and submissions received by the CMA

6.31 A significant number of complainants raised concerns that regular bills were not provided. Where bills were provided, complainants felt that these bills were inaccurate. Furthermore, many complainants also raised concerns regarding back billing. These concerns were also emphasised in responses to our update paper.

BEIS survey

6.32 The BEIS survey¹²⁰ indicated that there was relatively poor transparency in the heat network sector, with heat network customers reporting that they were less likely to receive any form of bill, account summary or statement, compared with non-heat network consumers.¹²¹

6.33 Furthermore, there is evidence that heat network bills, summaries and statements included less information compared to those issued to non-heat network customers. For example, heat network customers were less likely to be informed of the following: the amount of heating they had used (kWhs);¹²² the per-unit price;¹²³ or any standing or set charges.¹²⁴ Despite this, heat network customers were not less satisfied with the level of information they had received.¹²⁵ Customers on Heat Trust registered schemes received more comprehensive billing information in comparison.¹²⁶

BEIS experimental statistics on heat networks

6.34 BEIS statistics published in April 2018 suggest that the provision of information to heat customers is commonly limited.¹²⁷ Only around half the heat networks included in the BEIS statistics provide information to their

¹¹⁷ 30% for heat networks compared to 37% for non-heat networks.

¹¹⁸ 34% for heat networks compared to 18% for non-heat networks

¹¹⁹ 20% for heat networks compared to 9% for non-heat networks.

¹²⁰ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 42.

¹²¹ 62% for heat network consumers compared to 81% for non-heat network consumers.

¹²² 30% for heat networks compared to 61% for non-heat networks.

¹²³ 28% for heat networks compared to 57% for non-heat networks.

¹²⁴ 26% for heat networks compared to 47% for non-heat networks.

¹²⁵ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 42.

¹²⁶ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 5.

¹²⁷ [BEIS Experimental statistics on heat networks](#), Table 6.

customers on how their bill is calculated, fewer than a quarter provide monthly bills and fewer than half provide information on energy price and volume charged to the customer.

Kantar Public research

- 6.35 Some participants in the research reported receiving bills at irregular intervals, often with large gaps in between, resulting in some very high bills. Participants also reported not receiving billing statements and having difficulty in accessing their past statements, which meant that they were unable to query heating costs with suppliers.^{128,129}

Which?

- 6.36 Research undertaken by Which? suggested that bills were often unclear and confusing. Several respondents complained about their bill to their supplier. In some cases, customers received a refund after complaining, but this did not always occur.¹³⁰

CMA analysis of documents

- 6.37 Of the heat suppliers and property managing agents we contacted for a sample customer heat bill, a majority stated that they do not bill the customers on their heat networks based on individual consumption; the costs of heating and hot water are instead recovered via service charges apportioned to each property connected to the network. In most of the sample service charge summaries we received from suppliers and property managing agents, the service charges had been calculated on the basis of overall building usage, rather than on the consumer's own usage. In those cases, customers were not provided with information about the amount of heat they have used or the price per unit of heat, nor were they incentivised to adopt energy saving behaviours. Some service charges even included other costs combined with heating and hot water charges, making it still harder for consumers to understand how the charges were worked out.
- 6.38 We did, however, receive a small number of sample heat bills from suppliers and managing agents. In a review of this sample, we found that consumers were provided with information relating to the amount of heat they have used,

¹²⁸ Page 20, Kantar Public, [Qualitative Research: Heat Networks](#).

¹²⁹ Note that those who reported negative experiences with heat networks were mainly owner occupiers and, as explained in paragraph 6.4, the more negative experiences of owner occupiers compared to other groups of participants may be explained by the way in which owner occupiers were recruited.

¹³⁰ [Turning up the heat: getting a fair deal for district heating users](#), Which? March 2015, page 13.

the charge for each unit of heat used, the time period covered by the bill and the total charge for heating and hot water. In most cases, any standing charges were itemised separately although it was not always clear what those charges included. Whilst these results are encouraging, we note that the sample was not comprehensive.

Calculation of bills

BEIS Survey

6.39 In the survey a relatively large proportion of heat network customers' bills were not calculated in a transparent way. This is evident from the finding that only 36% of heat network customers, according to the survey, were billed based on actual or estimated household use. This contrasts with non-heat network customers (largely domestic gas customers) where 77% said that bills were based on actual or estimated use.¹³¹

6.40 Furthermore, the survey found that with regards to information on bills:

- (a) The time period that the bill covered was only provided in 47% of heat network customers surveyed compared with 60% of non-heat network customers;
- (b) The amount of heat used was only provided for 30% of heat network customers surveyed compared with 61% of non-heat network customers;
- (c) The amount charged for each unit of heat was only provided for 28% of heat network customers surveyed compared with 57% of non-heat network customers.

Without this information it is particularly difficult for customers to understand bills and therefore to challenge heat network suppliers.

6.41 There is greater clarity with regards to Heat Trust registered schemes where 74% felt they had a description of how their bills had been calculated, compared with only 31% of those on non-registered schemes.

6.42 A large proportion of heat network consumers were billed as part of a central service or rental charge, 47% of heat network customers paid for their heating and hot water either as part of a central service charge or in their rent. This was particularly the case in properties built pre-2000, where 59% of heat network customers paid through this method. This was relatively uncommon

¹³¹ [BEIS Heat Networks Consumer Survey](#), BEIS research paper Number 27, page 44.

in new builds where 22% paid for heating and hot water as part of a combined charge and where 74% paid a separate heating and hot water bill or paid as part of their overall energy bill.

Consumer research

- 6.43 Citizens Advice have reported receiving complaints regarding bills. Customers complained primarily that their bills were estimated not actual, inaccurate or unclear.¹³²
- 6.44 The Heat Trust Annual Report¹³³ noted that most billing complaints received by the Energy Ombudsman were to dispute the level of standing charge and the lack of clarity on what costs are recovered from standing charges. Billing complaints account for over two thirds of complaints sent to the Energy Ombudsman.

Heat supply contracts

BEIS Survey

- 6.45 As part of the BEIS survey, customers were asked whether they had received a 'contract document, such as a Heat Supply Agreement'¹³⁴ for the supply of their heating. Among non-Heat Trust heat network customers, 19% reported they had received this document, whilst 46% had not received this document and 31% did not know whether they had received this information.

CMA analysis of supply contracts

- 6.46 We included a request for heat supply agreements in the formal document request to all heat suppliers. The responses we received indicated that whilst larger suppliers, including many ESCOs, typically issue heat supply agreements, many smaller suppliers (some of who operate no more than one or a few networks) do not. However, instead there are provisions in leasehold and tenancy agreements which govern the supply of heat.
- 6.47 Our review of the agreements we received indicated that whilst there may be individual clauses in some agreements that a typical consumer might find difficult to understand – for example, the use of algorithms to calculate heat costs – there is not a consistent picture emerging that customers are subject

¹³² Citizens Advice Heat networks: a customer perspective A case study report: April 2016 - March 2017

¹³³ [Heat Trust Annual Report Findings from year one](#).

¹³⁴ A key Heat Trust eligibility requirement is for heat energy suppliers to contract with domestic and micro business properties through a Heat Supply Agreement. This paragraph therefore focuses on non-heat trust heat network consumers.

to unfair contract terms. However, we note that this assessment is based on a relatively small number of heat supply contracts.

Findings on transparency during residence

- 6.48 The information we gathered indicates that there may be a lack of transparency for customers regarding heat bills, including the calculation of bills. This may make it more difficult for customers to control costs and plan outgoings. It may lead to a reluctance to use heat. Where bills and charges are not transparent, customers may be less able to challenge suppliers about costs, prices and services – potentially reducing the pressure on suppliers to provide reliable, value-for-money heat.
- 6.49 The majority of suppliers told us that they do not bill the customers on their heat networks individually; the costs of heating and hot water are instead recovered via service charges levied on each property connected to the network. Where bills were provided, the small sample that we reviewed contained the key items of information. However, a number of stakeholders raised concerns about the information contained in bills.
- 6.50 We found that only a limited number of customers have heat supply contracts, meaning key information, contractual rights and obligations may not be available.¹³⁵ This may also weaken the ability of customers to challenge suppliers and therefore their ability to incentivise suppliers to provide a better deal.
- 6.51 We set out recommendations to improve transparency both pre-transaction and during residency in section 7.

¹³⁵ Furthermore, a heat supply agreement may also set out: the identity of relevant parties to the contract; the nature of service to be provided; guaranteed service standards; compensation for breach of service standards; dispute resolution; price, tariffs, metering and billing details; future variations to price and tariffs; length of agreement; and arrangements at end of contract.

7. Recommendations

7.1 In this section, we set out our recommendations to make the market work better for heat network customers as follows:

- (a) aims, scope and basis of our overall package of recommendations including our proposal that there should be a sector regulator for heat networks (paragraphs 7.2 to 7.11);
- (b) recommendations that fall under the remit of the sector regulator:
 - (i) the overall statutory regime (paragraphs 7.12 to 7.32);
 - (ii) regulation of prices (paragraphs 7.33 to 7.66);
 - (iii) regulation of the quality of service (paragraphs 7.67 to 7.72);
 - (iv) transparency of information (paragraphs 7.73 to 7.97); and
 - (v) compliance with minimum technical standards (paragraphs 7.98 to 7.109).
- (c) interim regulatory arrangements (paragraphs 7.110 to 7.118); and
- (d) recommendations to be implemented in partnership with other public bodies (paragraph 7.119).

Aims and scope of our recommendations

7.2 Our recommendations are intended to address the concerns that we have identified in relation to:

- (a) outcomes for heat network customers (section 3);
- (b) misaligned incentives between property developers, heat network operators and customers in the design and build of networks (section 4);
- (c) monopoly supply and delivery models (section 5); and
- (d) low transparency regarding heat networks before moving into a property and during residency (section 6).

7.3 The recommendations in respect of the regulation of price, quality and transparency are intended to protect the domestic customers of heat networks including customers of all existing heat networks.

- 7.4 In addition, we are making recommendations targeted at the construction of new heat networks (eg regulation of minimum technical standards and planning). The consideration of future schemes is important as we have been told that the number of heat network customers will grow significantly over the next few years. We are seeking to ensure that this growth can be delivered in a way that maximises benefits for heat network customers alongside the wider economic and environmental benefits that heat networks seek to deliver.
- 7.5 We expect that our recommendations, when viewed as a package of measures, will work together, along with existing regulation and other planned initiatives. The aim is to ensure good outcomes for heat network customers, whilst also ensuring the continued sustainability of the sector. In developing our recommendations, we have been mindful of the government's objective of encouraging growth in the sector.
- 7.6 Our recommendations are practicable and could be implemented quickly by a new sector regulator, subject to the passing of the required legislation. We consider that Ofgem, working alongside BEIS and the devolved governments, would be well placed to undertake the detailed design phase of our recommendations. Ofgem could draw on the experience of industry stakeholders including voluntary mechanisms such as those implemented by the Heat Trust.

Basis for the overall approach to our recommendations

- 7.7 We consulted extensively on the recommendations that we proposed in our update paper. Overall, stakeholders were highly supportive of our proposed recommendations. We received written submissions from over 20 stakeholders regarding our analysis and recommendations.¹³⁶ We sought feedback on our recommendations through an industry round table on 24 May 2018. We also held further stakeholder meetings. We have incorporated this feedback in the design of our final recommendations in this final report.
- 7.8 Our analysis in sections 3 to 6 above does not show a systematic gap between heat prices and quality of service relative to benchmarks based on other sectors. However, we have identified some material risks to heat network customers, especially at the point of the up-front design and build of heat networks. As heat networks are natural monopolies and that there are plans to build many more networks, these risks have the potential to affect many more customers in the future.

¹³⁶ [Responses to update paper](#).

- 7.9 If we had decided to make a market investigation reference, the CMA could have used its order making powers to remedy some of the concerns directly. For example, we could have ordered individual companies to price at a level no greater than cost or no greater than the price of an alternative source of heat and hot water supply.
- 7.10 However, as set out in section 8 of our update paper, we have concluded that controlling outcomes directly through order making powers following a market investigation reference would not be the most effective method of remedying the concerns identified above, or be sufficient to address all the concerns identified. Many of these issues, including the need to define and monitor compliance with technical standards, consumer protection and redress mechanisms, will require ongoing intervention by a sector-specific regulatory body.
- 7.11 Therefore, we are making the following recommendations:
- (a) We recommend that government puts in place a statutory regime whereby there is a sector regulator with the power to regulate the heat networks sector with regards to price, quality of service and compliance with minimum technical standards.
 - (b) We recommend specific rules for heat networks in respect of planning and building regulations, leaseholder arrangements, and property sales disclosures. Whilst these recommendations would be implemented by other public bodies, the sector regulator would be well placed to consider these themes and work in partnership with the bodies with direct responsibility for these rules and regulations in order to achieve good outcomes for consumers.

Statutory regime for the regulation of heat networks

Recommendation

We recommend to BEIS and the Scottish Government that a statutory framework should be set up that underpins the regulation of all heat networks.

- **The regulatory framework should be designed to ensure that all heat network customers are adequately protected. At a minimum, they should be given a comparable level of protection to customers of gas and electricity in the regulated energy sector.**
- **The scope of regulation should include price, quality of service, transparency and minimum technical standards.**

- **The sector regulator should be given formal powers to introduce regulation in these areas, and to monitor and enforce compliance with regulations.**
- **Ofgem would be well placed to take on the role of the sector regulator**

- 7.12 In sections three to six of this report, we have identified several issues that contribute to the heat network market not working well for consumers (see paragraph 7.2). We are recommending that heat networks should be regulated – by which we mean that a statutory scheme should be set up under which the sector regulator has powers to set regulatory requirements, rules and guidance for heat networks.
- 7.13 We are recommending that sector regulation is put in place because heat networks are natural monopolies providing an essential service. It is common for such services to be regulated to protect consumers and to ensure that providers can be required to act in the public interest.
- 7.14 We are recommending a regulatory regime for heat networks that sets out a broad framework of principles within which heat network operators have to operate when they deal with customers. We are also recommending that the broad framework covers technical standards for the design, build and operation of heat networks. We are not recommending specific rules and regulations -for example we are not recommending industry-wide price caps or detailed rules for the standards of service that should be provided by every heat network. We described this as a ‘principles-based’ form of regulation. This is distinct to an approach based on monitoring companies against specified outputs or outcomes defined by a sector regulator. During the consultation process, there was strong support among stakeholders for a ‘principles-based’ regulatory regime.
- 7.15 Stakeholders suggested a flexible regulatory regime was required because it would cater for the diversity and number of operators in the heat networks market, and future innovation and changes in the market. We expect the sector regulator will consider these factors. For example, the regulator would need to take a proportionate approach in implementing regulations for the smallest heat networks, and those operating on a not-for-profit basis. It should also be able to review the design of the regulatory regime to reflect changes in the heat networks industry from time to time.
- 7.16 The sector regulator should, where appropriate, be able to draw on and seek to maintain the benefits from work already done by existing industry bodies

including the Heat Trust and the ADE's work on technical standards. Several stakeholders suggested this in their responses to our update paper.

Duties of the sector regulator

7.17 We consider that the sector regulator should have regard to the principle that all customers of heat networks should be given a comparable level of consumer protection to gas and electricity customers, irrespective of the size and age of the heat network. We expect that the regulator will monitor and enforce on:

- (a) **price**, by providing guidance and implementing regulations on the appropriate price of heat for customers;
- (b) **the approach to the construction of new heat networks**, including how contractual arrangements are designed to reflect the interests of heat network customers;
- (c) **quality** of service:
 - (i) definition of **measures** for quality of service of heat networks;
 - (ii) handling of customer **complaints**, relating to price and service quality;
 - (iii) **continuity** of service, relating to the insolvency of an operator or termination of service for any other reason.
- (d) **transparency** of information along the customer journey; and
- (e) industry **technical standards** on the building of new heat networks and the operation of all heat networks.

The regulator and its powers

7.18 These roles would require new legislation, as they go beyond the powers BEIS currently has under the Heat Network (Metering and Billing) Regulations (2014), and those which the CMA has under Schedule 8 of the Enterprise Act.

7.19 The recommendation to have a sector regulator does not necessarily imply that the regulator needs to be independent of government. However, we consider that an independent regulator such as Ofgem would have the experience and organisational structure to implement and enforce such regulations, if asked by government to do so. Several stakeholders that responded to our update paper stressed the importance of having an independent regulator.

- 7.20 We consider that Ofgem is well placed to be the sector regulator. Almost all stakeholders that responded to our update paper supported this position. Ofgem is already the regulator for gas and electricity and it has expertise in relation to consumer protection and regulation. Stakeholders also told us that Ofgem would be well placed to align consumer protection measures for customers of heat networks with those supplied by gas and electricity.
- 7.21 There are some areas, such as the regulation of heat network minimum technical standards, where Ofgem would have to build its expertise and capacity. As discussed above, we expect Ofgem to work closely with industry participants such as the ADE, the UK Decentralised Energy Association and the Heat Trust.
- 7.22 We considered whether the regulatory role could be carried out by local authorities. There is an important role for local authorities in respect of granting planning permission for new heat networks, including overseeing the use of building regulations relevant to heat networks (see paragraphs 7.98 to 7.109). Regional bodies or development organisations may also apply rules or guidelines in respect of the technical standards or contractual arrangements associated with heat networks that they approve or support. This would reduce the need for oversight by a sector regulator at the point of construction.
- 7.23 However, stakeholders have neither suggested – nor presented evidence that – the appropriate form of regulation should vary by local area. We consider that a single regulator would be the most efficient approach, would reduce costs and would provide increased certainty to heat network investors. We therefore recommend that there should be a single national regulator, such as Ofgem, which designs and enforces on a consistent set of regulations across Great Britain.
- 7.24 From the perspective of customers, expectations of standards of service and customer protection will not change whether heat is provided by a heat network or by other options such as gas or electricity. In this context, we expect that Ofgem would be able to follow a comparable approach to customer protection as in the other sectors it regulates.
- 7.25 As discussed in section 2, heat is a devolved matter in Scotland and therefore some of the decisions on the appropriate body to regulate will need to be taken by the Scottish Government. We recommend that BEIS and the devolved nations work together to determine whether it would be appropriate for Ofgem, which has powers in England, Scotland and Wales, to take responsibility as the sector regulator across these three nations. In this regard, we note that only the UK government has the ability to extend Ofgem’s remit

to include heat. In Northern Ireland, there is a separate regulator which could take on a similar role, although there are currently very few heat networks in Northern Ireland.¹³⁷

Monitoring compliance and enforcement

- 7.26 An effective regulatory regime requires the regulator to have suitably designed duties and a mechanism for it to identify, monitor and enforce those regulations. This could either be implemented through a licensing regime or a general authorisation regime. In this regard, we understand that the Scottish Government is considering licensing heat networks. We also note that Ofcom regulates telecommunications providers under a general authorisation regime.¹³⁸
- 7.27 We consider that a general authorisation or licensing regime that regulates heat networks against a set of regulatory principles laid down in rules and/or guidance would be a proportionate regulatory regime given the number and diversity of networks in the UK and the projected growth in the sector. The sector regulator would also need to have the powers to monitor compliance with these regulations. This could be through monitoring against reporting by heat network operators and the ability of a regulator to investigate complaints. The regulator would need sufficient powers to obtain the information it would require from heat network operators to perform these functions effectively.
- 7.28 The sector regulator should also have the powers to enforce against heat networks that do not comply with the regulations. As discussed below, there are a number of areas in which we expect that the regulator would largely focus on investigating complaints, rather than directly monitor all heat networks (of which there are over 14,000). Where the regulator identifies that heat network operators are not complying with regulations, enforcement mechanisms should include fines and customer redress, with the ultimate sanction of withdrawing the permission for a company to operate a heat network.

Scope of the regulatory framework

- 7.29 As discussed above, the scope of regulation of heat networks should be designed to ensure that all customers are reasonably protected, whilst also being proportionate and not placing an undue burden on operators, given the

¹³⁷ [The Northern Ireland Authority for Utility Regulation](#).

¹³⁸ Under the General Authorisation regime, licences are not required for providing communications services in the UK, anyone is generally authorised to do so. However, this is subject to both General Conditions of Entitlement, and, for some providers, to Specific Conditions. More detail is available on [Ofcom's website](#).

small size of many heat networks. The scope of regulation should include both existing networks and new heat networks.

- 7.30 We expect that some regulation, in particular around there being sufficient consumer protections in place, will apply equally to all heat network operators. However, there are some forms of regulation which are both less relevant to smaller communal heat networks where the 'right-to-use' remains with the leaseholder, and will also be more costly to apply to small heat network operators.
- 7.31 We expect that the regulatory framework should not impose undue burden on small heat networks and not-for-profit organisations, where some of the risks associated are relatively small. At the same time, the regulator will need the powers to intervene where any heat network of whatever size is persistently failing its customers. In other words, the sector regulator should take a pragmatic and risk-based approach to regulation.
- 7.32 In the following paragraphs, we provide more detail on the areas we recommend should be in the scope of sector regulation for heat networks. These are:
- (a) Prices.
 - (b) Cost of construction.
 - (c) Quality of service and consumer protection.
 - (d) Transparency.
 - (e) Technical standards.

Regulation of prices

Regulatory framework

Recommendation

We recommend that the sector regulator requires all heat networks to comply with ‘principles-based’ rules or guidance on pricing.

The sector regulator should:

- **apply flexibility in its guidance as to the appropriate pricing and tariff mechanisms, referenced to appropriate price benchmark(s) or cost plus a reasonable profit margin; and**
- **adjudicate on cases where prices deviate significantly from the guidance and principles.**

7.33 We recommend that heat networks should comply with rules relating to the price and quality on a ‘principles-based’ approach. Heat network operators should adhere to rules or guidance that set out a framework for the contractual terms on which heat network operators contract with their customers.

7.34 Where heat network operators do not comply with the regulations, the sector regulator should have the power to enforce against non-compliance (see paragraphs 7.27 to 7.28).

7.35 The regulations regarding prices are needed particularly in respect of heat networks where there is an incentive, or ability, for operators to exploit their monopoly power, ie where there is a private operator and the ‘right to use’ does not sit with customers.¹³⁹ However, given that customers in all parts of the heat network sector are at risk of poor outcomes and the essential nature of heat, we propose that this protection regarding price and quality of service should apply for all domestic customers of heat networks.

7.36 It would be for the regulator to determine an appropriate approach to monitoring and compliance with price regulations. We discuss below the need for increased transparency for customers regarding the tariffs they are paying

¹³⁹ For example, a scenario where the freeholder contracts directly with an ESCO, transferring the ‘right to use’ of the network to the ESCO (see paragraphs 5.31 to 5.44).

for heat which would, in turn, provide supporting evidence for complaints by customers about high prices. The regulator could also require reporting by heat network operators of tariffs or revenues.

Price mechanisms: Benchmark and cost-based

7.37 In light of the evidence we have gathered during our study, we recommend that either of the following approaches are included by the sector regulator in the scope of acceptable pricing mechanisms for pricing to users of heat networks:

- (a) cost-based approach – this would set tariffs based on cost (including a reasonable margin); and/or
- (b) benchmark price(s) – examples of benchmark prices include the price of alternative fuels such as gas (including the cost of an individual gas boiler) or electricity. We are recommending a gas benchmark, for the reasons stated below.¹⁴⁰

7.38 Our recommendation of ‘principles-based’ price regulation in part reflects that heat networks are very different: there is no ‘one size fits all’ benchmark price, and in practice the gas benchmark is well above the prices paid by many heat network customers. There is a real risk that a price cap could become a default level of pricing for heat network providers and result in higher prices for customers of many networks.

Cost-based approach

7.39 Our understanding is that the majority of heat network tariffs are calculated on a cost recovery basis. Most networks are operated by property management companies, local authorities or housing associations. Such networks typically set prices solely to recover the costs of operating the network, potentially with an associated sinking fund to cover asset replacement costs. Under these contractual arrangements there is no ‘for-profit’ body which might have the incentive to increase prices above cost.

7.40 In this case, prices will be set by reference to costs, possibly including a small mark-up. Customers do not face the risk that prices are high as a result of high profits earned by a heat network operator which does not face competition.

¹⁴⁰ We have been told that in large contracts, the price is typically informed by reference to alternative fuels and quality of service standards.

- 7.41 Customers are not protected in this approach from the risk that prices are high because the cost of the network is high, for example because it is inefficiently run. Where the consequence is that prices are above a benchmark, even where profits are low, the regulator may conclude that further investigation is required to ensure that customers are getting a fair deal.
- 7.42 Our analysis of prices in section 3 has demonstrated that cost-based prices are, for most customers, below a gas benchmark – in some cases materially so. However, there could also be a small number of networks where customers pay cost-based prices that are well above the benchmark. We expect that the regulator would seek evidence as to why this might be the case, with the potential to intervene if cost-based prices were persistently high and there was no good evidence as to why costs should be well above benchmark levels.
- 7.43 For example, the cost of operating networks in some high-rise buildings may be higher than the benchmark, despite being the cheapest and most feasible heat and hot water solution for those properties. In these particular cases, a tariff above a gas benchmark may still be in customers' interests, and it is unlikely that the regulator would intervene.
- 7.44 In other cases, the network may be inefficient due to age, poor design and/or build, or inefficient operation. To the extent that these networks are relatively few, we would expect that the regulator may be able to do a more in-depth review of the efficiency of a network (or require the operator to do so), and seek to impose medium-term efficiency targets on operators or other remedies designed to address the detriment to customers of an inefficient network. In advance of proposed regulation, we recommend that high cost networks review their own efficiency with the aim of reducing costs and customer bills.

Benchmark pricing model

- 7.45 Under the ESCO model, the heat network operator (an ESCO) enters a contract with the freeholder or the developer to agree the terms for the operation of the network. As part of the contract, the ESCO should specify the tariff to be charged to customers over the life of the contract. This tariff needs to be set at a level which will allow the ESCO to recover the ongoing costs of operating the network, as well as any payment made to the developer in order to secure their long-term agreement. Such a contract should protect customers from the ESCO increasing prices to enhance profitability, where there is no option to switch supplier.

- 7.46 Our understanding is that in the ESCO model, the standard approach is to apply a tariff based on a benchmark price, such as the price of gas. Given that the services provided to heat network customers is comparable to the service provided by gas suppliers, customers on a tariff set by reference to a gas benchmark will be paying a similar price for a similar service.
- 7.47 We therefore recommend that the price of gas (and boiler) is currently an appropriate starting point for a benchmark price for heat networks. Gas is the predominant source of heating in the UK, and most customers on heat networks would likely have been supplied by gas, had the property they lived in not had a heat network connection.
- 7.48 Most stakeholders that responded to our update paper told us that a gas comparator would be the most appropriate benchmark. We also consider that a benchmark based on gas is proportionate for suppliers because our analysis of prices shows that a significant majority of heat networks from our sample had prices below the gas comparators (see section 3).
- 7.49 Stakeholders also suggested that the benchmark should draw on the Heat Trust calculator.¹⁴¹ We understand that that for some heat networks accredited by the Heat Trust, they reference their pricing to a benchmark that takes some combinations of the average unit rate (variable charge) of the standard variable tariffs (SVTs) for gas that are offered by the six large energy suppliers.¹⁴² The SVTs for gas are currently significantly more expensive than non-SVTs.¹⁴³ We therefore recommend that the sector regulator should set a benchmark which reflects a suitable average of the tariffs that are offered by gas suppliers when it determines the appropriate benchmark.
- 7.50 We have also been told that a benchmark based on gas is likely to need to be reviewed for suitability over the medium-term, in particular if the gas price increases over time and/or the approach to powering heat networks changes to reflect new and more carbon-efficient technologies. Whilst this is hard to predict, the sector regulator should have regard to such changes (which are likely to occur over the life of the assets being built today) when designing guidance for long-term contracts based on a benchmark price.

¹⁴¹ Heat Trust has developed a [Heat Cost Calculator](#) that allows a customer to gain an indication of the annual heating and hot water cost for a similar-sized property if it had a modern gas boiler.

¹⁴² Suppliers could charge below the benchmark price. See, for example, Ofgem's [standard variable tariff comparison](#) for information.

¹⁴³ [Average tariff prices by supplier: Standard variable vs cheapest available tariffs \(GB\)](#), Ofgem.

Recommendation

We recommend that:

- **The regulatory framework should require heat networks to give due consideration to whole life costs during the design and build phases, and how this is likely to impact prices for consumers.**
- **Where the whole life cost for customers of a new heat network exceeds that of alternative fuels, the additional cost should be met by the developer of the heat network, which will ensure that cost-based prices are consistent with a benchmark.**

7.51 We have described the whole life costs of heat networks in section 5. We consider that the regulatory regime should lead to good outcomes for customers of new heat networks by ensuring that the right design and quality of heat networks are constructed. Hence, we are recommending that for new heat networks:

- (a) there should be a requirement to have regard to whole life costing in the choice and design of the heat network; and
- (b) any additional annualised cost, over and above the cost to end users of alternative fuels, should be met by the developer including, where feasible, using alternative funding mechanisms. The consequence of this should be that the ongoing cost to be met by end customers through bills is no higher than the costs to customers of alternative fuels.

7.52 This regulation is required because several issues associated with the design choice of heat networks and the subsequent performance appear to result from a lack of consideration of end customer interests at the initial stage of developing a heat network (as described in section 4). In some cases, heat networks are over-specified resulting in high operating costs. In other cases, the initial construction may be of insufficient quality, resulting in high maintenance costs.

7.53 We also note that heat networks are constructed for several reasons, and neither the whole life costs nor the ongoing costs to be met by customers are likely to be the sole determinative factor in the decision to build a heat network rather than use alternative technologies. This in part reflects the fact that heat networks have other benefits, including environmental benefits, which will not be reflected in the cost of construction or operation. We have discussed the

planning process and the role of heat networks in meeting planning requirements in section 4 and Appendix D.

- 7.54 We sought views on the appropriate body to implement any regulation which is implemented at the point of construction of new heat networks, including whether this should be part of planning or building standards. In light of consultation responses and other evidence, we are recommending that the sector regulator should be responsible for implementing this recommendation as part of its approach to authorising or licensing new heat networks. This would allow for consistency between the initial contracting and the ongoing operation of heat networks. However, the regulator may have to work with the building and planning authorities to ensure that process of heat network design results in good outcomes for consumers. This is considered further under technical standards in paragraphs 7.98 to 7.109 below.
- 7.55 We also considered measures to reduce other forms of detriment to customers that could arise out of decisions made during the design and build phases of heat network development:
- (a) requiring the 'right to use' to be retained by customers, and not transferred to a third party such as an ESCO. This would mean that customers would retain the power to remove the heat network operator if they are unhappy with price and/or quality;
 - (b) banning capital contributions from ESCOs to property developers to reduce the costs transferred to heat network customers;
 - (c) mandatory re-tendering of heat network operating and billing contracts; and
 - (d) information remedies which would allow customers to understand whether their heat networks were providing value for money.
- 7.56 In the update paper, we said that that we would not pursue these measures. We did not consider them effective and/or proportionate, compared to our recommendation that mandatory rules and criteria around the form of price and quality mechanisms applied in long-term heat network concession agreements (see paragraphs 7.46 to 7.71 of the update paper). Almost all stakeholders that responded to our update paper agreed with our proposed recommendation, which remains unchanged.

The expected costs to be passed to consumers should not normally be expected to exceed a benchmark

- 7.57 The costs of installing the heat network infrastructure (CAPEX) in a new development are initially met by the developer as part of the construction phase. During construction of a new housing development, the developer is responsible for providing a wide range of services which are normally recovered by the proceeds of the sale of the properties in the development. This includes heat, as well as electricity, water, and physical shared services such as lifts.
- 7.58 In the case of gas, where any upfront costs of constructing the pipes and systems required for connection of individual gas boilers in a new development to the existing gas network are initially met by the developer.¹⁴⁴ The tariffs charged for gas then include an average cost for the maintenance of the wider gas network which is used to transport gas to individual properties. Following connection, tariffs do not include any charges specific to the development.
- 7.59 With regards to heat networks, developers have the possibility to recover their CAPEX spend in part or in whole through the sales price of the properties, capital contributions from an ESCO or, where the developer retains an interest in the properties, through the tariff (ie the price charged to heat network customers). The potential cost of being on a heat network can therefore include contributions to the capital cost of building the heat network, in a way which is not possible for customers of gas networks. In other words, heat network customers are potentially more exposed to making contributions to upfront capital costs than gas customers. This is why we considered whether it would be appropriate to effectively ban such capital payments where they are in the form of capital contributions by ESCOs.
- 7.60 The risk that heat network customers may be contributing to capital costs then should be offset against the fact that heat networks may be cheaper to operate than gas networks, as illustrated in Figure 3. Regulation should not discourage developers from investing in schemes that can deliver overall benefits for the end customer.
- 7.61 We have concluded that it is not proportionate to ban capital contributions and therefore to effectively cap heat network bills at their ongoing costs (see paragraph 7.56 above). As discussed in the recommended approach to

¹⁴⁴ The network charge included in gas bills covers a regionally averaged charge for operating and maintaining the local distribution network, but does not include any customer-specific incremental cost associated with connecting a new development to the distribution network. See, for example, Ofgem's [factsheet](#) on connecting a new property to the gas network.

pricing described above, a pricing approach for heat networks should be acceptable to the sector regulator and customers if it does not result in total bills being higher than what could be considered a reasonable benchmark price for heat and hot water. Our recommendation is that this should be a gas benchmark. Hence, regulation may allow for the possibility of some recovery of upfront heat network capital costs, where this can be done while still delivering lower prices for consumers, as measured by comparison in costs to a gas benchmark.

- 7.62 However, in circumstances where a heat network was built to meet the objectives of other institutions, such as central or local government, but as a result pushes prices above a reasonable benchmark, we consider that it might be appropriate for those additional costs to be met through mechanisms such as the Community Investment Levy.¹⁴⁵ Alternatively, where renewable sources of heat are used, networks could make use of the Renewable Heat Incentive Scheme to subsidise the additional costs of generating renewable heat.¹⁴⁶

How these recommendations will impact investment

- 7.63 Investment in the heat networks sector comes from a combination of private investors, public sector organisations and the not-for-profit sector. In some cases, the funding of heat networks may be supported by government initiatives designed to promote investment in heat networks as a renewable source of investment, such as HNIP.
- 7.64 We have been told by the ADE that more needs to be done to create a regulatory framework that would support private sector investment in heat networks. We consider that our proposals regarding the regulatory regime would reduce the regulatory risk associated with investment in heat networks. This would be consistent with the government's stated principle of promoting investment in renewable sources of energy including heat networks (see section 2). Moreover, a regulatory regime which protects consumers would reduce the risk that poor networks could harm the wider reputation of the sector and, in turn, discourage investment.
- 7.65 At the same time, there are characteristics of the heat networks sector which are different to the larger utilities such as gas distribution networks and gas suppliers:

¹⁴⁵ [Community Infrastructure Levy](#).

¹⁴⁶ [Renewable Heat Incentive](#).

- (a) for many heat networks, there are significant commercial risks, including demand risks, which are retained by the operator of the heat network;
- (b) in addition, our study has indicated that, for new heat networks, much of the upfront investment in the infrastructure within the development is, in practice, not recovered from ongoing charges to users, but is funded upfront;
- (c) in the case of a private new build, the developer will normally recover part or all of the investment from the buyer as part of the sale price of the new home; and
- (d) in other cases, the upfront cost may be funded by not-for-profit and public-sector organisations investing in heat networks to deliver longer-term benefits.

7.66 Our recommendations permit the recovery of upfront costs, so long as customer bills also remain reasonably priced. This balance should support investment into the sector, especially for well-designed and efficient heat networks.

Regulation of quality of service

Recommendation

We recommend that domestic heat network customers should be given similar protections to gas and electricity customers, particularly in relation to the quality of service and protections for vulnerable customers.

This also includes mandatory access to an ombudsman with the ability to investigate suppliers and make binding recommendations.

The sector regulator should also work with the industry to determine measurable performance indicators for service quality, with the objective that heat networks should be required to report against performance targets to the regulator and to customers.

7.67 We recommend that the sector regulator should ensure that heat network customers are given a level of protection which has the same effect as the protection given to gas and electricity customers. This regulation is required because heat is an essential service, and so issues relating to quality of service – particularly reliability – have the potential to cause serious harm to consumers.

- 7.68 We, therefore, recommend that the sector regulator should protect heat network customers in the following areas:
- (a) definition of performance indicators for quality of service and targets for resolving performance failures;
 - (b) a priority services register for vulnerable customers and support for vulnerable customers;
 - (c) requirements regarding billing frequency, the quality of bills, transparency in heat price calculations and payment arrangements and protection from back billing;
 - (d) as with other essential services, there should be a backstop to mitigate risk to customers from a business failure, with a mechanism for alternative provision in the event of insolvency;¹⁴⁷ and
 - (e) requirements regarding complaint handling and mandatory access to an ombudsman with the ability to investigate suppliers and make binding remedies.
- 7.69 The sector regulator should, where necessary, adopt consumer protection measures which are specific to the characteristics of heat networks and reflect how heat networks differ from gas networks. Unlike the retail supply of gas, heat network operators are natural monopolies with generation (energy centre), transmission (pipes) and retail supply all within one network, often owned communally by the leaseholders in a development. In addition, the ability to monitor and report against quality of service standards is likely to vary across different types of heat network.
- 7.70 An example of regulation where a different approach may be required could relate to the design of a 'supplier of last resort' (SOLR) function. In the case of gas and electricity, the SOLR takes over the retail supply function of an insolvent supplier. In the case of heat networks, the underperformance of the heat network may be the result of an inefficient and/or old energy centre, which no commercial operator would be willing to take on. We expect the sector regulator to adopt a pragmatic approach that balances the needs to customers and heat networks, while ensuring continuity of supply.

¹⁴⁷ In respect of gas and electricity, Ofgem appoints a 'supplier of last resort' in the case where an energy supplier is no longer able to serve its customers. A recent example related to the failure of the supplier Future Energy is available, where Future Energy customers were transferred to Green Star Energy. Details are available in [a letter published by Ofgem](#).

- 7.71 Several stakeholders have suggested that future regulation should draw on customer protection measures in the Heat Trust's Code of Conduct. They suggested the heat network customers should have access to the Energy Ombudsman, and also have the ability to seek redress. We consider that the sector regulator should give due regard to the work done by the Heat Trust and consider granting all heat customers mandatory access to an ombudsman with the ability to investigate suppliers and make binding recommendations, such as the Energy Ombudsman.¹⁴⁸
- 7.72 We also recommend that the regulator should review the standards of service specified by Heat Trust, and consider requiring all heat network operators to identify targeted levels of performance or standards of service for their customers. We understand that many heat networks, in particular small networks, are currently not able to accurately measure quality of service. We expect the regulator to take a proportionate approach to measuring performance, and also consider the size and capabilities of the operators of these networks. We do not propose that regulation should result in an undue cost burden on network operators, which is likely to be passed to customers in many cases.

Recommendations to improve transparency

Recommendation on transparency

We recommend that the government, including where appropriate a future sector regulator, implements rules or guidance as to the level of information which is necessary to help heat network customers.

This should include information required to allow people to make appropriate decisions when considering whether to live in a property with a heat network and information for heat network customers to understand and act upon their bills.

We consider that industry standards could be prepared in advance of the introduction of any statutory mechanism for monitoring and enforcement.

- 7.73 In section 6 above, we considered the information available to prospective heat network customers when looking for a place to live (ie pre-transaction transparency) and while living in a property. Whilst there are examples of good practice by property developers and heat suppliers, we have identified

¹⁴⁸ The roles and duties of the Energy Ombudsman are set out on its [website](#).

that, at both stages, information is commonly lacking and may be insufficient to support effective consumer decision making.

Transparency at the pre-transaction stage

- 7.74 We make a number of recommendations to improve transparency at the stage when consumers are deciding whether to purchase or rent a property.
- 7.75 The sector regulator should act to improve the provision of pre-contractual information for prospective buyers, such as factual information regarding the age, ownership and relevant parties operating the network (eg supplying heat or billing services), duration of contracts, and customer outcomes, such as tariffs and guaranteed terms of service.
- 7.76 We note that improving pre-transaction transparency requires input from property agents and landlords as a heat network operator will often not know about a new customer until after they have moved into a property.¹⁴⁹
- 7.77 The sector regulator should require the provision of heat supply agreements or equivalent which set out key performance indicators. We recommend that government or the regulator consider including indicators such as: (a) the number of planned outages; (b) the number of unplanned outages; (c) response times to outages or other network problems; and (d) the availability of customer call centres.
- 7.78 We also recommend that information regarding tariffs, dispute resolution arrangements and annual cost estimates (or previous bills, where available) is made available, as described in the provision of pre-contractual information section above. Heat supply agreements are already required for Heat Trust members (the Heat Trust has consulted on whether this should be expanded to 'heat supply arrangements').¹⁵⁰
- 7.79 We also agree with certain consultation respondents that further information and awareness raising may be required by the government, sector regulator and other stakeholders to improve consumer understanding of the significance of living in a home with a heat network including historic or estimated bills and charges over several years, estimates of planned and unplanned outages and other service issues, a compare and contrast summary of heat networks compared with other forms of energy utility.

¹⁴⁹ We understand that developers and private landlords have an obligation under section 20 of the Landlord and Tenant Act to consult with prospective purchasers on proposed heat charges.

¹⁵⁰ This refers to the collection of documents that state how heat and hot water will be provided. The [Heat Trust consultation](#) closed 27 April 2018.

- 7.80 Where a potential customer is made aware of this information and can make appropriate comparisons, they will be able to factor it into their decision to move into or purchase a property accordingly. This behaviour could better align the incentives of property developers and customers, deterring developers from choosing a network or approach which leads to higher costs for customers.
- 7.81 The provision and content of EPCs should be improved to help consumers understand the cost and implication of living in a property with a heat network (see paragraph 7.119(c)). These are likely to include changes to the EPC cost methodology to include ongoing repair and maintenance costs as well as a more informative description of the primary heat supply where it is a heat network. We note that the Scottish and Welsh governments are already exploring improvements to EPCs and that MHCLG's review of home buying and selling could provide an opportunity to improve information available to home buyers. In addition, BEIS is considering implementation of its response to the consultation on Standard Assessment Procedure (SAP)¹⁵¹ (the UK methodology for assessing the energy and environmental performance of homes consultation which underpins EPCs).¹⁵²
- 7.82 We also consider that the treatment of heat network assets, with respect to ownership and obligations of heat networks connected to a leasehold property, should be set out clearly within **leasehold agreements** (see paragraph 7.119(b)). In practice, this means that whoever owns the 'right to use' the network and the basis on which customers will be charged for its hot water and heating services should be clearly set out within leasehold agreements.

Consultation responses on pre-transaction transparency

- 7.83 Responses to the consultation agreed that consumers should be provided with sufficient information to make effective decisions about whether to live in a property with a heat network. Most respondents suggested that this sufficient information should be mandatory. Several respondents suggested that the Heat Trust already required sufficient information from its members.
- 7.84 Some heat suppliers stated that there are already examples of heat suppliers making sufficient information available. These suppliers and some other respondents noted that this key information does not always reach the prospective resident at the point when the consumer is looking for a property. This may be because the heat supplier may not have a relationship with the

¹⁵¹ [BEIS SAP consultation](#).

¹⁵² Further detail is set out in Appendix E.

prospective tenant when that consumer is looking for a property. Rather, the property developer, property owner or intermediaries, such as estate or letting agent, interact and market the property to consumers.

- 7.85 Therefore, these respondents suggested that the sufficient information requirement should be on the actor or intermediary offering the property, rather than the heat supplier. Some respondents emphasised the low awareness of heat networks in the UK and proposed mandatory provision of key information that goes beyond that seen in most utilities to include heat bill comparisons with comparable non-heat network properties.
- 7.86 Respondents that referred to EPCs tended to agree that EPCs did not provide sufficient or realistic estimates of the likely cost of living in a property with a heat network. This was because EPC energy cost estimates do not include the cost of repair and maintenance of the heat network which is commonly the largest part of a consumer's heat bills. These respondents suggested that EPCs should be improved to include the cost of repair and maintenance on a 'whole life basis' or should, at least, state that this is not included. One respondent noted that care should be taken with the methodology as whole life costing can only be an estimate.
- 7.87 Respondents tended to agree that a heat supply contract or charter should be provided to consumers. Several respondents noted that awareness of heat networks is low in the UK and that raising awareness could be a responsibility of all stakeholders.

Transparency during residency

- 7.88 We make a number of recommendations to improve transparency during residency.
- 7.89 The sector regulator should require the provision of more detail in heat supply bills to enable customers to better assess and act upon the bill to manage their consumption. This may go beyond that required in the existing Heat Network (Metering and Billing) Regulations 2014 (see paragraphs 2.44 to 2.46). This is likely to include, as a minimum, information on the period of the bill, the unit cost and quantity consumed. We consider that further information is necessary including a breakdown of costs included in standing and variable charges to help customers act upon their bills and hold suppliers to account for their costs and performance. Where heat is included as part of service charges, this information may also be necessary.

- 7.90 The sector regulator should make specific requirements regarding the frequency of bills beyond that required by the Heat Network (Metering and Billing) Regulations 2014.¹⁵³
- 7.91 We also consider that the sector regulator should design and require standard performance metrics to be reported against by heat network operators – for example, in relation to planned and unplanned outages and heat temperatures. We consider that the regulator should be mindful of the specific characteristics of heat networks but also cross-utility scorecards that may be developed. We recommend that the sector regulator considers whether price and other relevant information should be published.
- 7.92 When introducing this new regulation for heat network providers, the sector regulator would need to consider both the appropriate form of transparency and disclosure and also the proportionality of producing the information. Some heat networks are very small, and it is likely that such very small heat networks would need to be exempted from certain of the regulations.

Consultation responses on transparency during residency

- 7.93 Responses on transparency during residency were mixed with most, but not all, suppliers stating that no further information on bills was necessary beyond that already required by the Heat Trust for its members. Some suppliers and their representatives stated that this information required by the Heat Trust in bills provided by its members should be mandatory. One supplier stated that information should be similar to that required in energy and gas bills. That supplier also proposed stating capital replacement cost in bills.
- 7.94 Consumer representatives all suggested additional information was necessary including more information on the contributing components of the bill. Ofgem's recent consultation on principles based regulation was noted as a relevant model. The UK District Energy Association also suggested that a consumption and cost comparison over time and with similar properties should be included.
- 7.95 Most respondents agreed that standard metrics on performance should be published or made available to residents. However, there were mixed views on what the metrics should be and whether they should go beyond or be limited to what is required currently in gas and electricity. A consumer representative noted that the government's consumer green paper proposes

¹⁵³ [Schedule 2](#): Billed at least once a year and for electronic billing, billing information quarterly and bills twice a year

the development of performance scorecards in the regulated sectors which may be relevant.¹⁵⁴

- 7.96 Following the consultation, we recommend that government, including where appropriate a future sector regulator, implements rules or guidance as to the level of information which is necessary to help heat network customers. We consider that this should cover:
- (a) the information required to allow people to make appropriate decisions when considering whether to live in a property with a heat network, which would be implemented as part of wider rules on the information provided to purchasers, such as EPCs (see paragraph 7.119(c)); and
 - (b) information for customers of heat networks to understand and act upon their bills. This would also include the need for and format of heat supply agreements, ie contracts governing heat network provision.
- 7.97 We expect that (a) could be implemented and monitored as an enhancement to existing MHCLG and devolved nation regulations requiring the provision of property information. We expect that (b) could only be enforced by a sector regulator, but would be consistent with the voluntary arrangements being promoted by the Heat Trust. We therefore consider that industry standards could be prepared in advance of the introduction of any statutory mechanism for monitoring and enforcement of these standards.

Implementation of minimum technical standards

Recommendation

We recommend that all heat networks comply with a new set of minimum technical standards, focusing on measurable performance outcomes, such as operational efficiency.

New standards should be developed, drawing on existing industry expertise including CP1, to allow monitoring and compliance with quality standards.

Additional training and certification should be made available to engineers to improve their knowledge and technical understanding of heat networks across their various stage of development, up to and including operation and maintenance.

¹⁵⁴ Modernising consumer markets: Consumer Green Paper, BEIS (2018).

- 7.98 Heat networks provide an essential service of the same importance to heat network customers as gas or electricity. However, we have been told that the technical standards of heat networks are not comparable to these other sectors. Our review has identified that the absence of mandatory technical standards results in some heat networks being built to poor technical standards. For example, some are too hot whilst others suffer frequent interruptions to heating.
- 7.99 We have been told that the structure of the heat networks sector, in which many heat networks are commissioned and built by property developers, makes these problems worse. Once complete, developers will often transfer the risks associated with heat networks to customers or to an ESCO. The interests of the developers are often not aligned with the long-term interests of customers. Given the importance of heat to customers, developers should be held to account for the quality of the heat networks they commission and build.
- 7.100 We have found that customers would benefit from higher technical standards across the various stages of the development of heat networks, from their design and build, through to their operation and maintenance, both in terms of quality of service and in reducing the risks of costly asset failure. As such, we consider that compliance with technical standards should be a mandatory requirement for authorisation or licensing of new heat networks.
- 7.101 There was widespread support amongst the respondents to our update paper for improvements in this area. At present, the CIBSE ADE Heat Networks Code of Practice (CP1) aims to increase standards across the supply chain. The ADE is also seeking to develop a voluntary quality assurance scheme to accredit heat networks which are designed, built and operated to a sufficiently high standard. However, these initiatives are only voluntary and do not act as a compliance scheme.
- 7.102 In addition, CP1 is not fully comprehensive in its coverage. Several respondents remarked that given the differing characteristics across networks, in terms of size, scope and fuel source, technical standards should not be too prescriptive and rather, should be measured against operational performance. These outcomes are likely to overlap with commercial and financial considerations, encoded in contractual arrangements. For example, achieving a certain system efficiency will be part of delivering a target heat price and quality of service (ie meeting Heat Trust standards).

- 7.103 Nonetheless, CP1 represents a helpful starting point and underpins the Scottish Government's heat network licensing proposals.¹⁵⁵
- 7.104 We expect that the industry should be able to develop a set of enforceable technical standards at each stage of the network's development. There are several mechanisms through which these improved standards could be embedded across all new and existing heat networks, those expanding or refurbishing or those currently operating as a condition of a licensing or authorisation regime.
- 7.105 If the scope of CP1 were developed to enable the measurement and monitoring of compliance with performance metrics, such as system reliability and quality of service, technical standards could be enforced via planning and building regulations at a:
- (a) National level – by ensuring that the community heating guidance in The Building Regulations UK and planning guidance in England, Scotland and Wales appropriately references the CIBSE ADE Heat Networks Code of Practice (CP1) and Heat Trust.
 - (b) Regional and local level – by encouraging local authorities (through regional bodies where there is one) to include CIBSE ADE Heat Networks Code of Practice (CP1) and Heat Trust standards in local or development plans (or supplementary guidance as per London Heat Network Manual).
- 7.106 Nonetheless, we still consider that it should form part of a sector regulator's responsibilities to make compliance with such standards a requirement to operate all new and existing heat networks as part of a heat network licensing or authorisation regime. This provides an opportunity to ensure that the industry develops one or more accreditation schemes which are acceptable to the sector regulator.
- 7.107 Compliance with an enforceable CP1 set of standards or a form of quality assurance accreditation could form part of the conditions set to obtain a licence. This would require those building heat networks to ensure that they are of sufficient quality, as the operation of the heat network would be conditional on meeting technical standards. This could be confirmed either by the developer or an ESCO, but in either case the heat network operator should require assurances that the heat network has been constructed in accordance with industry standards. Ahead of the introduction of a sector

¹⁵⁵ [Scotland's Energy Efficiency Programme: Second Consultation on Local Heat & Energy Efficiency Strategies, and Regulation of District and Communal Heating](#), paragraph 103.

regulator, this type of accreditation could form part of the conditions for Heat Trust membership, or be a requirement of any central, regional or local government funding.¹⁵⁶

- 7.108 Some private and public sector organisations involved in commissioning and building heat networks raised concerns that there was a lack of engineers with the requisite skillset and experience to design, build and operate heat networks to a sufficiently high standard. These respondents advised that a certification scheme for qualified personnel would add significant value to this industry. We are aware that CIBSE currently runs a two-day course to train heat network consultants. However, in its current form, this course does not provide, nor does it intend to provide, sufficient training or accreditation for engineers to become qualified experts in this field.
- 7.109 It would not normally be for the sector regulator to determine how industry experts are trained and accredited. However, our study has indicated that to protect customers, stronger enforcement of technical standards is necessary, and that this will be difficult without both better access to skills and a suitable accreditation scheme to support this. We recommend that government and/or the sector regulator should engage with organisations, such as CIBSE, to develop formal training opportunities and accreditations with respect to the design, build and operation of heat networks. This should ensure that the introduction of enhanced technical requirements on those operating and building heat networks can be implemented effectively.

Interim regulatory arrangements

- 7.110 We are conscious that there will be a lead time to implement our recommendations and that, in the meantime, certain customers will be paying relatively high prices for their heat and/or receiving poor quality service. We are also conscious that several new networks will be constructed during this period.
- 7.111 We propose to work with BEIS, the Scottish Government and the sector to identify how improvements can be made for current and future customers prior to our recommendations being implemented.
- 7.112 We note that there are a number of government initiatives providing capital funding for construction of district heating including: BEIS' Heat Network

¹⁵⁶ The Heat Trust consulted in February 2018 on how eligibility could be opened up to heat networks without a separate heat supply agreement.

Investment Project¹⁵⁷ in England and Wales; the Scottish District Heating Loan Fund;¹⁵⁸ and the Mayor's Energy Efficiency Fund¹⁵⁹ in London. We consider that many of the principles below could be taken into consideration in the review and approval of those new schemes by these bodies under the existing regulatory mechanisms.

- 7.113 As noted in section 2, networks funded by BEIS under the HNIP are required to meet Heat Trust equivalent standards as well as meet minimum technical standards in terms of performance and efficiency of systems. In Scotland, networks financed by the District Heating Loan Fund are required to become Heat Trust members and we consider that a condition of this type of funding should involve compliance with a minimum set of technical standards, as set out in paragraph 7.105.
- 7.114 We also note that new developments are likely to require planning permission from local authorities to install heat networks. We expect that our recommendations which relate to the planning process and the development of building regulations for heat networks could be implemented in advance of any legislation for sector regulation.
- 7.115 In respect of customers of existing networks, the government or a sector regulator should be able to put in place an early consultation on the regulations which could be applied, in advance of formal enforcement powers being in place. This would allow heat network operators to be aware of the proposed regulations, and where necessary to allow them a suitable period to adjust and become compliant.
- 7.116 Heat networks which are operating inefficiently should also review the causes of this inefficiency and take steps to address this, in turn reducing customer bills.
- 7.117 At the same time, if it were identified that there were examples of heat network operators acting in a way which was resulting in serious detriment to customers in the interim period, the CMA may take enforcement action. This could be either under consumer enforcement powers or Competition Act powers. For example, it is possible that consumers could be subject to unreasonably long lock-in terms, which could be unfair under the Consumer Rights Act 2015. In addition, it is possible that there could be breaches of the Consumer Protection from Unfair Trading Regulations 2008 in relation to a

¹⁵⁷ [Heat Networks Investment Project](#), BEIS.

¹⁵⁸ [Scottish District Heating Loan Fund](#).

¹⁵⁹ Mayor's Energy Efficiency Fund (MEEF), previously [London Energy Efficiency Fund \(LEEF\)](#).

lack of transparency or mis-selling, depending on the availability and nature of the pre-contractual and other information.

- 7.118 Alongside this report, we have published an open letter to the sector to set out the concerns we have identified in our study, remind suppliers of best practice in relation to transparency and their obligations under consumer and competition law as well as under the Heat Network (Metering and Billing) Regulations 2014.

Recommendations that need to be implemented in partnership with other public bodies

- 7.119 We are also making recommendations which would need to be implemented in partnership with other public bodies. These recommendations are in areas where it is necessary to make changes to existing regulations in order to take account of specific issues concerning heat networks. We are recommending to BEIS and the Scottish Government that these are implemented alongside our primary recommendation that there should be a sector regulator, and that government departments should work together to ensure a consistent approach to implementation of these recommendations:

- (a) **Planning and Building Regulations** where we have identified that rules regarding heat networks are not clear enough (see paragraphs 4.16 to 4.19). As set out in paragraph 7.105, technical standards could be enforced via planning and building regulations at both a national and local level through various mechanisms.
- (b) **Leaseholder arrangements** including a recommendation that there is greater clarity regarding how heat networks in leasehold properties are treated in terms of ownership and responsibility for operation and maintenance (see paragraph 7.82).
- (c) **Property sales disclosure rules** including a recommendation that transparency of information prior to residency, such as of EPCs, be improved (in England this is the responsibility of MHCLG; the Scottish and Welsh governments have responsibility in their respective nations). These should help consumers understand the cost and implication of living in a property with a heat network (see paragraph 7.81). This includes the impact of performance of heat networks (see paragraphs 7.91 and 7.96(a)). We also note the role of property agents and private landlords in ensuring that pre-transaction information is provided (paragraph 7.76).